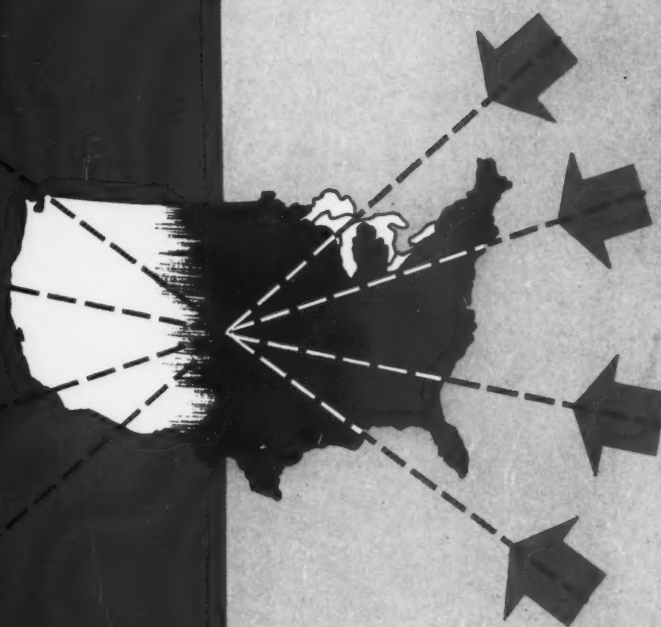
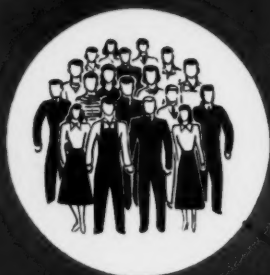


WESTERN INDUSTRY



ANNUAL REVIEW

IN THIS ISSUE: The World Moves West—"Western Industry" Takes Stock of Today's Regional Trends; Significant Angles in Western Industrial Decentralization; Expansion Estimates to 1960 for Pacific Northwest Industries; Tooling Requirements for New Production Era; Materials Handling Planning Cuts Corners on Costs; Unvarnished Facts on Marine and Oil Strikes

Thirty-Five Cents

VOLUME XIV

NUMBER 1

January, 1949



PERRY KILSBY INC.

STEEL TUBULAR PRODUCTS

3311 EAST SLAUSON AVENUE
LOS ANGELES 11, CALIFORNIA
JEFFERSON 9161

AN OPEN LETTER TO INDUSTRY IN THE WEST:

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We will warehouse stocks of practically every type of steel tubing in most alloys, carbon, and stainless, and, as distributors for Shelby Seamless Tubing, a product of National Tube Company, we will maintain warehouse stock and accept orders for direct mill shipment.

The policy of our company is to offer a consistent sales and service operation, and, because we have confidence in the West and know that industrial growth is the foundation of economic strength, we shall base our business operation on making the best possible effort to serve you well.

You know now that your tubular steel problems will receive prompt and expert attention. And you can call upon us any time without obligation.

Sincerely,

PERRY KILSBY INC.

Perry Kilsby
Perry Kilsby, Pres.

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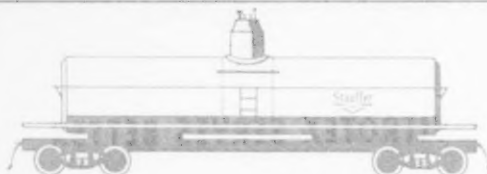
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This Month in WESTERN INDUSTRY

VOLUME XIV

JANUARY, 1949

NO. 1

Editorial Page

Editorial Comment	15
Measuring the Trends What the West Needs	
Mail Box	15

The Western Outlook . . . News . . . Statistics	17
---	----

Articles

The World Moves West—"Western Industry" Takes Stock of Today's Regional Trends	29
Developments of 1948 Reveal Imposing March of Progress	36
Tooling Requirements for the West's New Production Era	39
Expansion Greater But Similar to Prewar Pattern	42
Significant Angles in Western Industrial Decentralization	44
Expansion Estimates to 1960 for Pacific Northwest Industries	46
Materials Handling: Materials Handling Planning Takes on Major Status	51
Significance of Chemical Factors in Industrial Waste	54
Production Techniques: New Method of Rust Prevention Incorporated in Wrapping	56
Beryllium Copper Molds Reduce Tooling Costs	57
Eight Simple Rules for Storage Battery Maintenance	64

Regional Reviews

Tehachapi to Tijuana	70
Sierras to the Sea	74
The Pacific Northwest	76
The Continental Divide	78
The Wasatch Front	80

Departments

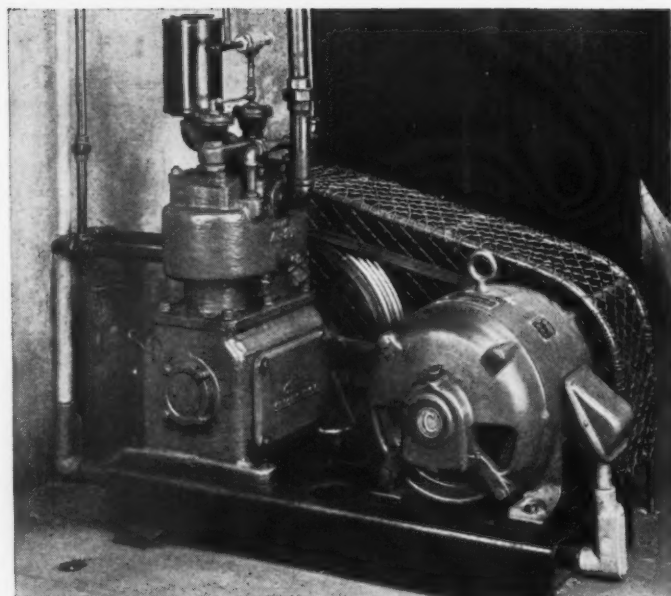
Westerners at Work	82
Labor and the Industrial West	59
The West on Its Way	86
Trade Winds	92
New Methods, Materials, Equipment	66
Helpful Literature	68
Book Reviews	69

Advertisers' Index	98
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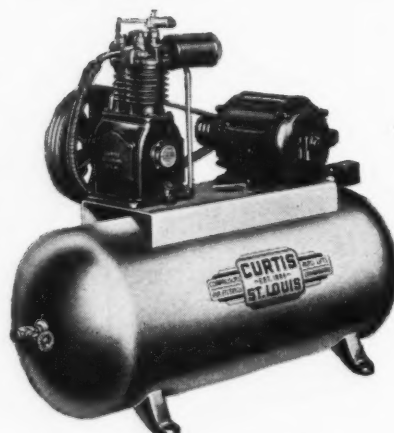
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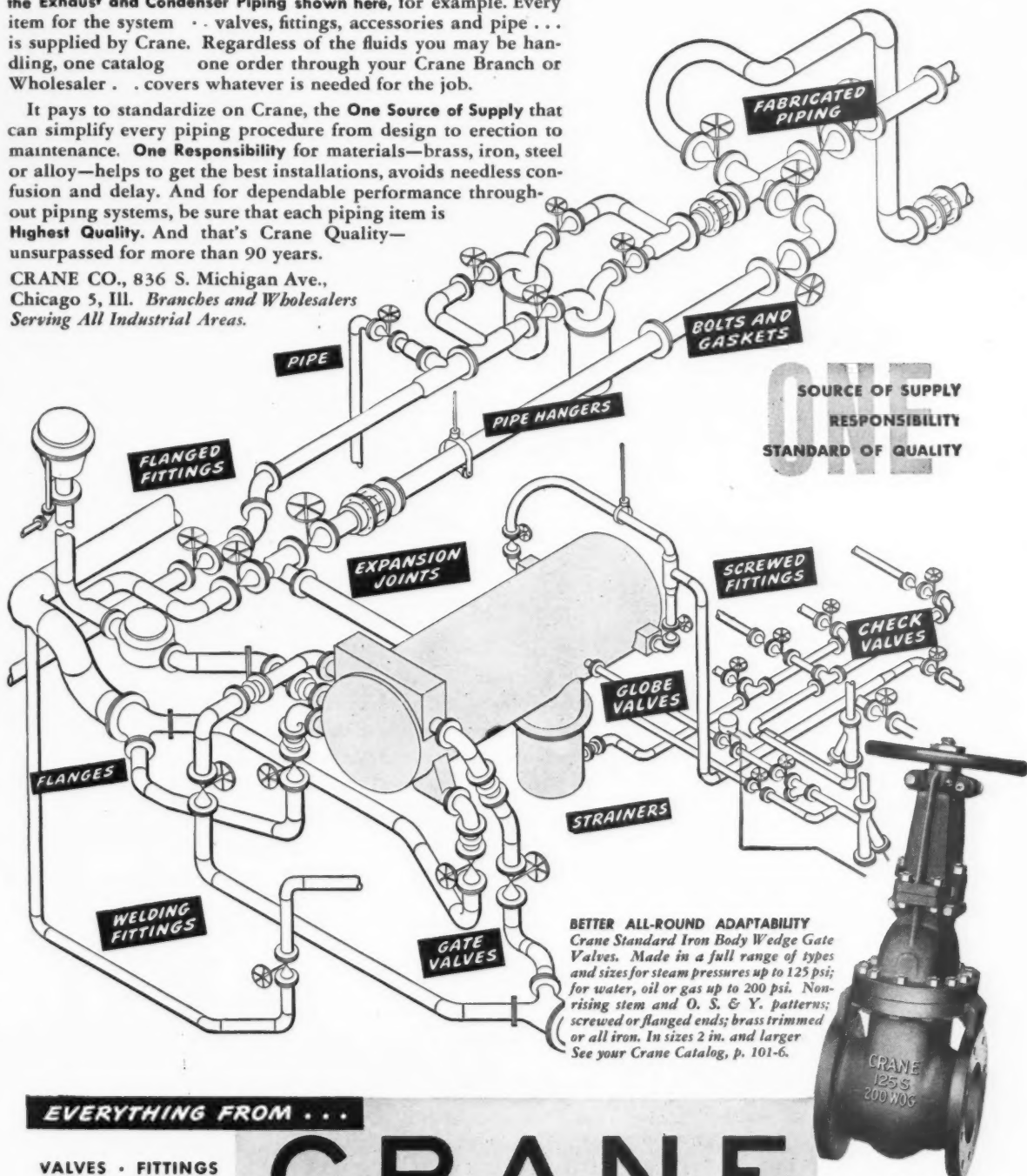
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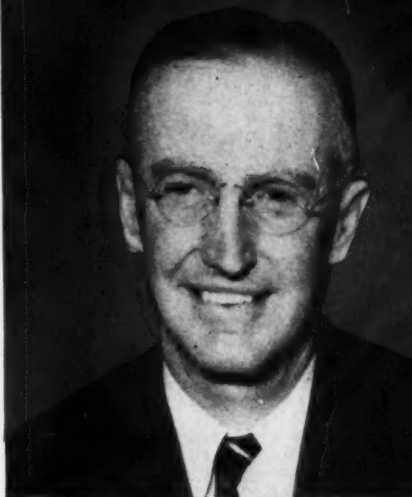
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3269 Fasteners are used in 1 small American car



104 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

CHEMICAL USERS' GUIDE To General Chemical Products for the Paper Industry

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTH (MIN.)	SHIPPING CONTAINERS	APPLICATIONS
Aluminum Sulfate $Al_2(SO_4)_3 \cdot 14H_2O$ approx. (Alum)	Commercial & Iron Free: Lump, Ground Powdered	17.25% Al_2O_3	Bags Bulk Carloads	Precipitation of rosin size and filler; water clarification; manufacture of satin white; pitch control; mordant for dyes.
Aluminum Sulfate $Al_2(SO_4)_3$ + water (Liquid Alum)	Liquid	32° Be (total Al_2O_3 7.2%)	Tank Trucks Tank Cars	Same as commercial dry product but lower strength.
Salt Cake Na_2SO_4 (Sodium Sulfate)	White or Grayish Granules	95-99% Na_2SO_4	Bags Bulk Carloads	Used in kraft cooking liquors as the source of Na_2S .
Glauber's Salt, Crystal $Na_2SO_4 \cdot 10H_2O$ (Sodium Sulfate)	Colorless Crystals	96% $Na_2SO_4 \cdot 10H_2O$ (42.3% Na_2SO_4)	Bags Barrels	Substitute for salt cake in kraft cooking liquor.
Glauber's Salt, Anhydrous Na_2SO_4 (Sodium Sulfate)	White Granules	99.5% Na_2SO_4	Bags Bulk Carloads	Same as Crystal but stronger product.
Sulfuric Acid H_2SO_4	Liquid	66° (93.19%), 99%, 20% oleum and higher strengths	Carboys Steel Drums Tank Trucks Tank Cars	Wire scouring; parchmentizing; acid wash in last stage of multi-stage pulp bleaching; neutralizing tall oil soaps.
Sodium Thiosulfate $Na_2S_2O_3 \cdot 5H_2O$ (Hypo)	Colorless Crystals	99.75% $Na_2S_2O_3 \cdot 5H_2O$	Bags Fibre Drums	Anti-chlor.
Sodium Sulfite, Anhydrous Na_2SO_3 ("Sulfite")	White Powder	98.5% Na_2SO_3	Bags Fibre Drums	Anti-chlor.
Sodium Silicate $Na_2O \cdot xSiO_2$ + water (Water Glass)	Liquid	38°, 41°, 42° Be; special and higher strengths	Steel Drums Tank Cars Tank Trucks	Adhesive for corrugated and solid fibre board; used in coating mixtures to reduce viscosity and in beater sizing to stiffen paper.
Chromium Potassium Sulfate $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$ (Potash Chrome Alum)	Red Violet Crystals	99.5% $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$	Fibre Drums	Used in "save-all" or white water systems.
Aqua Ammonia NH_4OH + water (Ammonia)	Colorless Liquid	26° Be (29.4% NH_3)	Carboys Steel Drums Tank Trucks	Used with chlorine to form chloramines for slime control.
Sodium Fluoride	Powder	90% NaF 95% NaF	Barrels Fibre Drums	Preservative and stabilizer for starch in coating mixtures.
Tetrasodium Pyrophosphate, Anhydrous $Na_4P_2O_7$ (TSPP) (Pyro)	White Powder	98% $Na_4P_2O_7$ (Equiv. 52% P_2O_5)	Bags	Felt washing; pitch dispersion.
Nitric Acid HNO_3 + water	Liquid	42° Be 67.2% HNO_3	Carboys Drums Tank Trucks	Nitrating pulp; cleaning monel metal.
Sodium Sulfide Na_2S + water	Red Chips or Solid Mass	60% Na_2S	Steel Drums	Substitute for salt cake in modified soda process.



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Leach Silo Unloaders, manufactured by the Leach Company of Oshkosh, Wisconsin are a boon to farmers in eliminating an unpleasant chore and conserving ensilage. But packing the 1200 pound, oddly shaped units in such a way that they could be handled and installed conveniently presented a difficult problem. Some method for shipping the machine as a group of sub-assemblies that would pass through small silo doors was essential.

Wirebounds solved the problem. Wirebound engineers "tailored" eleven different boxes and crates to package and protect the various parts of the unloader for safe, convenient shipping and handling. At the receiving end, re-assembly was easier because contents could be seen and identified through the sides of the Wirebounds for unpacking in proper sequence.

Light weight Wirebounds meant real shipping economy for Leach too. Less than seven man-minutes were required for packaging any one of the unloader sub-units and packed crates could be stacked 10 high to conserve valuable floor space!

Wirebounds can provide an efficient, economical solution to your shipping problems. Mail the coupon below!



161 pound motor for the Leach Silo Unloader is mounted on a crate base which is engaged by the bottom cleats of the Wirebound.



The door-like fourth side is folded shut and the wires are twisted closed with an electric toggle twister.

another "ODD SHAPE"
shipping problem solved by
WIREBOUNDS!

► **MAIL THIS COUPON TODAY**

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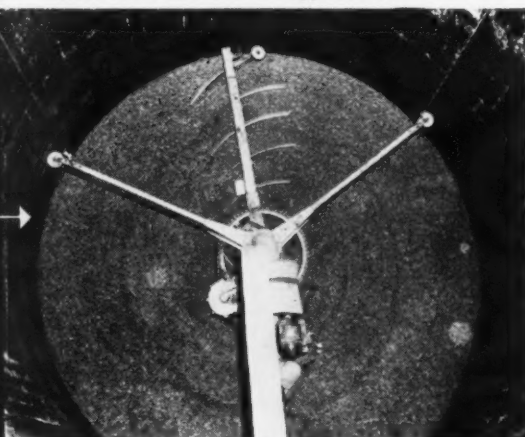
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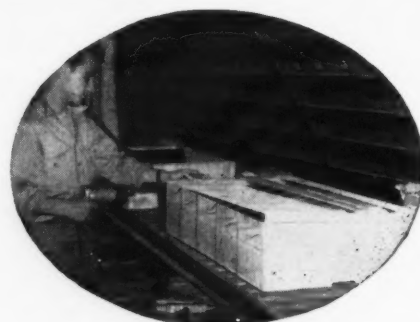
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PRODUCT _____	

SIXTY WIREBOUND PLANTS THROUGHOUT THE UNITED STATES



The unusual shipping problem encountered by the Leach Company is readily apparent in the above view of the assembled Silo Unloader.



Unpacking the 11 Wirebounds at the erection site is no problem since the twisted wire closures need only be cut to open.

In Our Mail Box

Editor, *Western Industry*:

I appreciate the chance to comment on your editorial of December, 1948 (quoting Mr. Mason as saying that laws should be classified in accordance with their degree of acceptance as moral standards, like a target with the bull's eye representing those universally accepted and the surrounding rings the laws which in lessening degrees represent morality).

In answer, I would put the basing point decisions out on the non-scoring area of the bull's eye. Far removed from the compulsion of conscience, devoid of the sanctions of custom or habit, these "5 C" decisions lay the precedent for a complete change of our distributive system by administrative fiat.

If we should prefer change, I prefer the 500 Congressional spokesmen of the people do it rather than the five members of a commission.

LOWELL MASON
Member, Federal Trade Commission
Washington, D. C.

Editor, *Western Industry*:

Congratulations on your excellent article, "Financial and Managerial Controls Shift Westward," appearing on page 55 of the November issue of *Western Industry*.

We are certainly glad to see put into print these reasons why a conservative financial institution believes in the future of the West, and we should like to send copies of these sentiments to a number of people who we believe are interested.

A. P. WESTLUND
Industrial Consultant
Department of Water and Power
City of Los Angeles

Editor, *Western Industry*:

We certainly wish to thank you for your cooperation in publishing the article by Mr. F. B. Ortman, president, California Manufacturers Association, concerning functions of the California Conference of Industrial Relations.

We have released a reprint of this article to CMA members, as per the attached bulletin, and I am sure this will prove of great interest to our membership, as well as other organizations engaged in industrial development of California.

JOHN A. KNAUFT
Director, Legislative Department
California Manufacturers Ass'n.

Editor, *Western Industry*:

I like the Reeves Rubber record system, and believe they should get high unit production of better than average quality due to the good personnel relations promoted under that plan. I do not think their plan is applicable to most types of business, particularly the large ones, or those not turning out specialty jobs. For Reeves' particular situation they have shown good reasoning.

GENERAL ACCOUNTING MANAGER

Editor, *Western Industry*:

I recently came across a reference to an article which appeared in a recent issue of *Western Industry* on the subject generally of "break-even statements." I would like very much to obtain a reprint of this article, if available, or a copy of the issue in which the article appears.

If there is any charge I will be glad to assume it.

HERBERT GRANOFF
Certified Public Accountant
New York, N. Y.

EDITORIAL COMMENT

Measuring the Trends

IN PRESENTING within the compass of these pages the first annual Review and Forecast Number of *Western Industry*, we have endeavored to chronicle some of the industrial growth and economic trends of the West.

The figures are easy to read, and it is reasonable to assume that the increase of population and industrial activity will continue at the same rate for the next few years. But to measure the trends it becomes necessary to see them as the sum of the individual hopes, achievements, convictions and fears of the 18 odd million people who go to make up the West's population.

Only by looking deep into what these 18,000,000 individuals consider the necessities of life, only by studying what are the comforts and luxuries they feel do or should lie within their reach, only by taking into account what educational advantages they feel are the rightful heritage of their children, only by recognizing what protection against loss and want they look on as essential, can the trends for the future be surely determined.

Once upon a time, if the individual or family could not acquire these "social gains" unaided, they did without. Today, however, the aid of labor unions and government is invoked with increasing frequency to provide these benefits, either directly from the earnings of business, or indirectly by means of governmental subsidies disguised as social security, pensions, free school lunches, and so on which the wage and salary earner partly pays for himself in income and excise taxes.

What the West Needs

WHAT can the West—meaning the eleven Western states—as an economic community do to better itself in 1949? We offer a few suggestions, as follows:

1. Endeavor to understand better that it is an economic community, a distinct marketing area, with common denominators of interest that need to be brought to light. Fortunately some steps are being taken in this direction through the efforts of the Western States Council.

2. Weigh the federal government's programs for Western development carefully, lest economic mistakes be perpetrated because of the urge to spend without adequate preliminary investigation.

3. Keep its members of Congress thoroughly informed as to Western conditions and needs. Too often these officials are disregarded because they belong to an opposite political faith, instead of the community realizing that they represent everyone, and can be highly useful.

4. Insist that these Western members of Congress get themselves appointed to the Congressional committees where they can do the West the most good. *Western Industry* devoted considerable attention to this situation two years ago, but now there are many Western "freshmen" in Congress who need educating.

5. Keep alert to the freight rate situation. Much apprehension is felt over effect of the basing point decision of the Supreme Court, but the percentage increases in rates may have still more influence on Western industrial growth.

6. Promote production conferences devoted more specifically to the development of methods that will enable Western manufacturers to compete with their eastern brethren who have many more years of experience behind them. Some of the ground covered at the management conferences sponsored by the Society for the Advancement of Management has been of great value, but entire conferences devoted to nothing else but the practical problems of production are badly needed.

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UNITED STATES STEEL

THE WESTERN OUTLOOK..News...Statistics... 1

Fewer employed in manufacturing in October than September but gain shown over year ago; Carloadings show sizeable decline July through September; Northwest voluntarily curbing power uses to meet shortages; California power situation improves; Pressure easing some on U. S. oil production; Lower-grade lumber prices drop; Building costs show jump upward.

EMPLOYMENT estimates for the latest period for which statistics are available show fewer manufacturing employees working in October than in September in California, Oregon, Nevada, New Mexico and Utah, while Arizona and Washington were reporting increases in manufacturing ranks.

However, six of the eleven Western states were employing more workers in both manufacturing and other non-agricultural industries during October than in October, 1947. Nevada reported 400 fewer industrial workers than a year ago but a gain of 200 in mining. No figures were available for Colorado, Idaho and Wyoming and Montana's totals were for August.

Arizona non-agricultural employment was estimated at 155,800 for October, up 2,100 from September and up 9,400 from October, 1947. Manufacturing, 15,100, up 1,100 from September and up 1,100 from October, 1947. Mining, 13,600, up 100 for October and 500 over October, 1947.

CONSUMERS' PRICE INDEX

From Bureau of Labor Statistics
100=5 yr. avg. 1935-39

	Los Angeles	San Francisco	Portland	Seattle	Denver
May 15	169.1	....	....	174.3	....
June 15	168.8	174.2	....	....	....
July 15	170.3	....	180.3	....	172.5
Aug. 15	171.0	....	....	176.2	....
Sept. 15	171.0	177.1	....	....	....
Oct. 15	171.8	....	180.1	....	171.0

California manufacturing reported 34,000 fewer workers between September and October, dropping from 801,700 to 767,600, primarily reflected in seasonal contraction in fruit and vegetable canning as well as work stoppages.

Nevertheless, this is the highest peacetime October level on record and is 4 per cent above the year-ago total of 736,400, according to Paul Scharrenberg, Director of Industrial Relations for California, and M. I. Gershenson, Chief of the Division of Labor Statistics and Research, San Francisco.

California employment was higher than

a year ago in three-fourths of the manufacturing industry groups. The aircraft industry increased 6,900 workers between October 1947 and 1948; lumber, 6,900; iron-steel, 6,100; apparel, 4,100; printing, 3,200.

Nevada, reflecting the end of the tourist season, reported estimated employment for October decreased 1,300 from September, according to Denver Dickerson, executive director, Nevada Employment Security Department, and Max D. Kossoris, regional director, Bureau of Labor Statistics, San Francisco. Nevada reported 48,100 employees for all industries in October, down 1,400 from September and 400 from October, 1947. Mining reported 200 more workers than a year ago.

Oregon reported seasonal layoffs in construction, lumbering, agriculture and food processing industries to record a rise of 30.9 per cent in unemployment. The state reported 27,500 out of work and additional unemployment was expected.

(Continued on page 19)

MANUFACTURING EMPLOYMENT

Estimated Number of Employees in Non-Agricultural Establishments—Source: U. S. Bureau of Labor Statistics

	MONTANA	IDAHO	WYOMING	COLORADO	NEW MEXICO	ARIZONA	UTAH	NEVADA	TOTAL MTN.
	1947	1948	1947	1948	1947	1948	1947	1948	1947
May	17,100	17,000	....	....	9,100	9,300	14,200	16,200	24,110
June	17,800	17,700	....	....	9,100	10,000	14,800	16,500	25,030
July	....	18,200	....	....	9,300	10,400	14,000	15,700	29,810
August	18,200	18,000	....	....	9,300	10,500	13,400	15,700	29,820
September	....	....	....	....	9,100	10,350	13,800	14,400	30,820
October	....	....	....	....	8,850	10,100	....	15,100	30,170

	WASHINGTON	OREGON	CALIFORNIA	TOTAL PACIFIC
	1947	1948	1947	1948
May	174,900	152,350	117,100	130,300
June	179,300	163,400	....	689,300
July	176,500	179,900	....	712,900
August	185,000	183,150	....	741,300
September	186,850	190,450	....	760,200
October	183,900	191,600	....	770,900

INSURED UNEMPLOYMENT

(Under all programs: figures in thousands. From Social Security Board)

Week ending	Ariz.	Colo.	Idaho	Mont.	Nev.	N. Mex.	Utah	Wyo.	Total Mtn.	Calif.	Ore.	Wash.	Total Pacific
June 5	4.4	4.2	1.5	2.0	1.4	2.4	2.3	.4	18.6	193.7	11.7	25.7	231.1
July 3	4.2	4.0	.8	1.2	1.3	2.3	2.2	.3	16.3	172.4	9.7	17.7	199.8
July 31	4.5	4.1	1.0	1.2	1.2	2.3	2.5	.4	17.0	173.6	9.4	19.5	202.5
August 28	4.8	3.5	.9	.9	1.1	2.0	2.9	.3	16.4	164.0	7.7	19.9	191.6
October 2	4.3	2.2	.5	.7	1.2	1.2	2.1	.2	12.4	145.6	7.8	20.3	176.7
October 30	4.4	2.2	.6	.8	.9	1.5	4.1	.3	14.8	146.6	10.5	20.9	178.0

INDEX NUMBERS OF WHOLESALE PRICES BY GROUPS OF COMMODITIES AND BY MONTHS

Bureau of Labor Statistics, Washington 25, D.C.
(1926 = 100)

Year and Month	Farm Products	Foods	Hides and Leather Products	Textile Products	Fuel and Lighting	Metals and Metal Products	Building Materials	Chemicals and Allied Products	House Furnishing Goods	Miscellaneous	ALL COMMODITIES
Yr. Avg.	189.1	177.4	187.5	150.2	132.6	157.1	196.4	134.7	142.6	121.5	163.9
May	196.0	181.4	186.8	149.6	133.1	158.7	196.8	135.7	143.4	121.4	166.2
June	194.9	188.3	189.2	148.9	135.7	162.8	199.4	134.4	144.5	120.3	168.6
July	191.1	189.5	188.4	148.5	136.6	170.8	202.8	132.0	145.4	119.6	169.4
August	189.1	186.2	187.5	147.8	136.7	171.9	203.9	133.3	146.1	119.9	168.5
September	189.1	186.2	185.5	146.8	137.2	172.4	203.3	134.4	147.4	119.0	165.0
October	182.3	177.3	185.5	146.8	137.2	172.4	203.3	134.4	147.4	119.0	165.0

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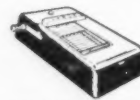
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THE WESTERN OUTLOOK..News...Statistics...

2

(Continued from page 17)

Oregon's estimated non-agricultural employment for October reached new highs for that time of year. The total was 436,900 workers, down from the 445,500 of September, but ahead of October 1947's 425,700 workers. Manufacturing workers totaled 145,400, compared to September's 151,800 and October 1947's 137,600.

Montana reported 141,600 working in non-agricultural industries during August, up 200 from July and up 5,100 from August, 1947.

Employment in New Mexico non-agricultural industries decreased 700 workers in October to 128,700, according to Benjamin D. Luchini, chairman-executive director, New Mexico Employment Security Commission, but the figure was 10,250 higher than one year ago. Manufacturing dropped from 10,350 in September to 10,100, but was ahead of the 8,850 workers of October, 1947. Mining reported 12,250 workers, up 50 in the month, and compared to 11,700 a year ago.

Washington estimates for October are 187,100 in manufacturing, compared to 190,450 in September, off 3,350; mining, 3,700, same as September; 699,500 non-agricultural, off 3,650 from September, but a gain for October of 10,100 over September, 1947. The outlook was for high winter employment.

Utah non-agricultural employment in October was estimated at 188,000, down 1,000 from September but 9,000 ahead of October, 1947. Manufacturing employees, 31,000, down 1,600 from September, but 1,564 ahead of October, 1947; mining, 13,800, down 200 from September and 392 from a year ago.

ELECTRIC ENERGY

(Production for Public Use—In thousands of kilowatt hours. Source: Federal Power Commission)

	Mountain		Pacific Northwest		California		Total Pacific	
	1947	1948	1947	1948	1947	1948	1947	1948
April	1,185,575	1,402,860	1,456,204	1,722,614	1,662,024	1,503,141	3,118,223	3,225,755
May	1,254,204	1,432,407	1,450,716	1,661,764	1,738,511	1,632,572	3,189,227	3,294,336
June	1,263,666	1,432,925	1,383,534	1,458,586	1,759,504	1,747,255	3,123,038	3,205,841
July*	1,342,747	1,558,236	1,382,030	1,663,475	1,911,232	1,946,914	3,293,262	3,610,389
August	1,296,208	1,500,992	1,445,637	1,722,841	1,890,554	2,061,250	3,336,191	3,784,091
September	1,277,108	1,473,455	1,428,510	1,699,765	1,761,157	1,859,470	3,189,667	3,559,235

*Revised.

NATURAL GAS (CALIFORNIA)

(Compiled by Roy M. Bauer, gas supply supervisor, Southern California Gas Company)

	—Number of Consumers—		—Utilization (In thousands of cubic feet)—	
	Domestic and Commercial	Industrial	Domestic and Commercial Sales	Industrial Sales
1948				
January	2,380,640	5,423	28,285,107	8,573,499
February	2,394,316	5,431	28,567,848	7,220,292
March	2,406,643	5,437	27,126,573	9,223,591
April	2,417,506	5,473	23,369,063	11,242,979
May	2,424,637	5,518	16,846,280	12,944,257
June	2,428,429	5,543	14,048,039	13,194,978

*Utilization figures do not include company use, storage, and unaccounted for.

**Includes figures from Texas.

BANK LOANS

Industrial, commercial and agricultural
(In millions of dollars)

From weekly reporting member banks of Fed. Res. System in 7 western cities: L.A., S.F., Portland, Seattle, Tacoma, Spokane, and Salt Lake.

(Average of Wednesday reports)

1948	1947
May	1,983
June	2,033
July	2,045
August*	2,108
September	2,100
October	2,184

*Includes 3 days of preceding month.

BANK DEPOSITS

(In millions of dollars—adjusted)

Daily average month, all member banks in 12th Federal Res. Dist. Demand deposits excluding U. S. Gov't deposits, cash items in process of collection, and interbank deposits.

1948	Net Demand Deposits	Time Deposits
May	8,720	6,012
June	8,777	6,019
July	8,735	6,026
August	8,834	6,009
September	8,950	6,004
October	8,937	6,012

FREIGHT

Cars of revenue freight, railroad carriers in 11 Western states.

(Compiled from Assn. of Am. R.R. weekly reports)

	Carloadings		Received from Eastern Connections	
	1947	1948	1947	1948
*May	522,144	688,311	279,392	356,101
*June	714,982	718,618	348,892	358,714
July	755,983	650,656	331,613	271,766
August	728,578	622,139	381,068	332,008
September	825,668	505,545	404,771	273,876
October	701,972	531,796	382,413	297,854

*5-week period.

decline from July through September from the 1947 levels, as do receipts from eastern connecting railroads. Pacific Northwest Advisory Board territory carloadings for 1948 through October were 1,010,764, compared with 1,080,764 in October, but above 1945 and 1946. Bank loans continue to climb, but demand deposits for October turned slightly downward.

(Continued on page 21)

WHOLESALESALES

In thousands of dollars. Percentage changes are from corresponding month of preceding year.
From Bureau of the Census.

MOUNTAIN

	Automotive Supplies	Change	Electrical Goods	Change	Furn. and house furn.	Change	Groc. and foods exc. farm prod.	Change	General Hardware	Change
April	789	0	3,657	+29	...	...	...	...	2,511	+26
May	284	+1	3,412	+13	...	...	...	...	2,313	+8
June	685	+17	3,832	+25	336	+28	...	...	2,356	+19
July	811	+7	3,731	+22	...	...	...	...	2,565	+26
August	752	+6	3,583	+36	242	-10	...	...	...	...
Sept.	727	+12	4,266	+29	...	...	...	...	...	...

PACIFIC

	Automotive Supplies	Change	Electrical Goods	Change	Furn. and house furn.	Change	Groc. and foods exc. farm prod.	Change	General Hardware	Change
April	1,949	-15	12,546	+21	281	+55	5,215	...	7,414	+4
May	2,687	-4	12,587	+15	281	+5	6,984	...	8,006	+3
June	2,756	+2	12,557	+11	239	+26	5,129	...	8,040	+8
July	2,686	-5	12,965	+14	1,435	+18	8,395	...	7,016	+8
August	2,181	+6	13,740	+23	303	+13	10,377	...	6,043	+1
Sept.	2,148	-4	17,422	+27	315	+5	4,507	...	7,439	+4

*Full-line wholesalers.

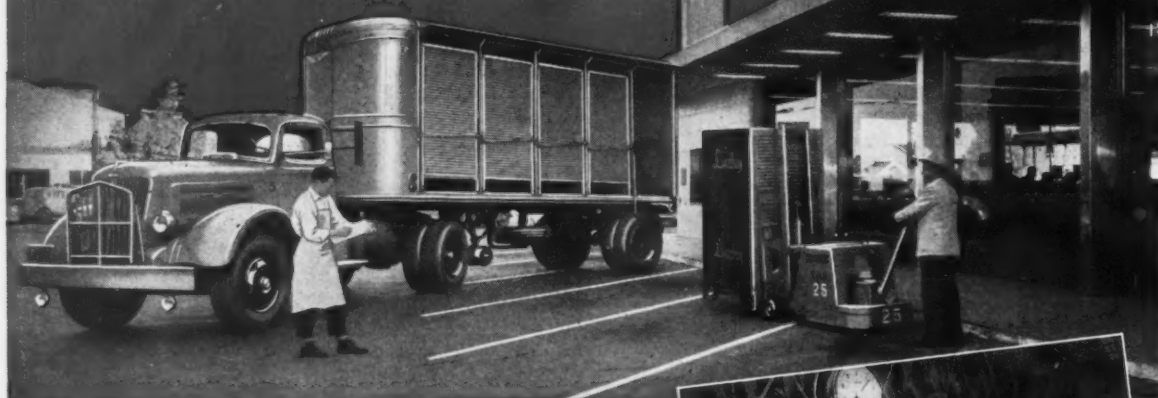
INDEX OF DEPARTMENT STORE SALES

Index numbers, 1935-39 daily average=100 with seasonal adjustments. Compiled by Federal Reserve Bank.

	Total 12th Fed. Res. Dist.		Southern California		Northern California		Portland		Western Washington		Eastern Washington and northern Idaho		Utah and southern Idaho		Phoenix	
	1947	1948	1947	1948	1947	1948	1947	1948	1947	1948	1947	1948	1947	1948	1947	1948
April	320	353	350	400	282	303	292	335	334	349	324	348	355	386	421	432
May	329*	356	363*	404	292	313	315	339	338	343	329	338	340	365	421	484
June	334	372	365	422	295	328	328	350	340	363	337	390	343	357	420*	459
July	331	365	363	411	291	318	329	382	341	344	313	382	359	334	404	464
August	353	383	401	454	307	326	326	380	359	340	350	385	361	352	440	487
September	347*	355	392	404	299	324	322	341	359	309	363	362	337*	329	459	473

*Revised

HOW LUCKY STORES *Lower* LINKAGE COSTS



This new Lucky Store at Oakland, Calif., is designed by Raymond Loewy—famed as a creator of some of America's most beautiful stores. Inset below shows modern vegetable counter.

LUCKY STORES' OPERATION is an interesting example of how Fruehauf Trailers effect distribution short-cuts for so many businesses.

This Oakland, California, firm operates 33 super markets in cities within a 99-mile radius. Stocking these stores from central warehouses is a major job requiring every delivery economy to maintain leadership in so competitive a field.

The company's entire mechanized "linkage" system is built around a fleet of 24 Fruehauf Trailers—all "rolling supply bins." Ten special Vans for side, lift-truck loading, as shown . . . 12 fully-enclosed Aerovans for pallet loads of dry packaged goods . . . and 4 Refrigerator Vans for meats and other perishables serve all departments. Shipments go directly to stores with no double-handling losses.

By using Trailers, Lucky Stores are able to employ the shuttle system to save trips and many man-hours each day. One Trailer can be loaded at the warehouse, while a second is unloaded at a store. During this time the truck-tractor, coupled to a third, is on the road. Here truck-tractors deliver peak efficiency and both initial and upkeep costs are lower.

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engineer and produce any number of "Specials" mean that similar savings are available in most hauling fields.

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THE WESTERN OUTLOOK...News...Statistics...

3

(Continued from page 19)

Electric Energy

Pacific Northwest's energy shortage this winter is estimated by Federal Power Commission officials at 150,000 kilowatts, and voluntary curtailment programs have been set going, with the likelihood at the time of going to press that the Washington Public Utilities Commission would set up compulsory controls. The shortage is principally at peak periods, and industries have been urged to shift their operations to off-peak hours as far as possible. The aluminum industry, for example, has about 87,000 kw. of interruptible load, but the varying conditions of water supply have caused intermittent curtailment rather than a fixed percentage of shutdown. Some of the extra aluminum power has come from British Columbia.

Despite appeals for conservation, the demand in the Northwest has reached new heights.

In California the situation is much easier, with daylight saving being abolished as of January 1, 1949, a change which will increase the peak demand from 5 to 10 per cent. The supply was increased about 100,000 kw. in December by the Pacific Gas & Electric Company's Station P in San Francisco coming into operation, with 75,000 kw. more due before long from the Los Angeles Department of Water & Power plant at Long Beach, which is nearing completion.

Steel

Apparently it will take from one-third to one-half of the total plate supply of the Pacific Coast to supply Consolidated Steel Corporation's order to build a transcontinental pipeline from Texas to New York. These 450,000 tons of plate will come from the Kaiser mill at Fontana, and as a second blast furnace is part of the deal, eventually it will mean a substantial addition to the Coast's supply, although for the next year or two it will diminish the general supply of plate.

In the first quarter of the year break-down or hot-rolled coils will begin to reach Columbia's new Pittsburg, Calif., mill from Geneva. The Geneva program for 1949 is 500,000 tons of plate, 160,000 tons of strip and 350,000 tons of hot rolled coil, but it is expected to take most of the year before capacity is reached.

The Fontana mill is still largely running on Vulcan ore, which will last four or five months more. Meantime about 25,000 tons of ore are being shipped to Fontana from the new Eagle Mountain mine, out of a total of 50,000 tons mined monthly.

Wire rope seems to be fairly readily available in the Los Angeles market as a result of operations at Bethlehem's new wire mill, and the supply of merchant bars and some structural shapes is easier because of increased output from Pacific States and other suppliers. Sheets, pipe and plates are the items which remain in the shortest supply.

Aluminum

Curtailement of electric power in the Pacific Northwest has cut Alcoa and Permanente back about half a potline each in their aluminum reduction operations, or 3,000,000 lbs. total a month, while Reynolds have been getting along without trouble because of firm contracts for their Longview and Troutdale plants. Operations were suspended at Longview for about a year and the electricity contract with Bonneville was relinquished. It could not be renewed for a year because of a Bonneville regulation to that effect, but in the meantime the aluminum picture

IRON AND STEEL

Western Area of the United States
From American Iron and Steel Institute (in net tons)

	Pigiron Output	Percent Capacity	Steel Output	Percent Capacity
May	187,501	84.5	398,905	92.9
June	202,796	94.6	397,414	95.5
July	196,608	89.0	410,244	95.7
August	163,319	73.8	374,342	87.1
September	168,534	78.8	360,252	86.8
October	188,238	85.0	413,721	96.3

Alloy Steel

	Output	Carbon Ingots, Net Topped*
May	7,173	9,341
June	6,948	3,072
July	5,445	6,638
August	4,848	6,383
September	3,553	6,119
October	6,879	10,916

*Included in total steel.

BITUMINOUS COAL AND LIGNITE

(In thousands of tons, From Bureau of Mines)

	(Colo.-N. Mexico)	(Wyoming)	(Utah)	(Montana)	(Wash.-Alaska)
April	431	370	482	378	514
May	485	563	557	519	653
June	520	505	596	477	581
July	298	391	345	346	408
August	490	536	518	480	523
September	629	596	638	508	532

PETROLEUM

(California, Oregon, Washington, Arizona, Nevada)

(From Bureau of Mines)

TOTAL DELIVERIES

(Thousands of barrels daily)

	CRUDE PRODUCTION (Barrels, daily avg.)	GASOLINE	GAS OIL & DIESEL	HEAVY FUEL OIL	ALL PRODUCTS
April	28,300	336	357	125	385
May	29,385	322	384	85	402
June	28,466	385	401	90	476
July	29,350	335	380	88	404
August	29,445	370	394	100	464
September	22,994	370	359	113	442

COPPER

(Short tons, From U. S. Bureau of Mines)

	ARIZONA	UTAH	MONTANA	NEW MEXICO	NEVADA	WEST'N STATES
April*	30,200	31,625	23,500	23,400	5,200	5,370
May*	31,000	30,815	25,000	24,120	4,800	5,270
June	30,000	31,750	26,000	23,406	4,760	4,900
July*	32,000	30,150	23,500	22,800	4,600	4,495
August*	29,870	30,125	22,620	23,980	4,160	4,385
September	29,800	29,330	23,200	22,915	4,000	4,360

*Corrected.

LEAD

(Short tons, From U. S. Bureau of Mines)

	ARIZONA	UTAH	MONTANA	NEW MEXICO	NEVADA	WEST'N STATES
April*	2,325	4,900	1,510	616	660	21,190
May	2,250	4,700	1,430	603	670	19,952
June*	2,237	5,086	1,450	638	540	20,375
July	2,480	4,190	1,340	596	700	19,372
August	2,500	4,680	1,400	826	660	20,531
September	2,250	4,500	1,430	554	780	19,762

*Revised.

ZINC

(Short tons, From U. S. Bureau of Mines)

	ARIZONA	UTAH	MONTANA	NEW MEXICO	NEVADA	WEST'N STATES
April	4,050	3,770	4,500	3,553	1,440	29,734
May*	3,915	3,410	4,285	3,220	1,250	28,206
June*	3,928	3,696	4,320	3,336	1,400	28,764
July	4,090	2,920	4,370	3,124	1,430	28,354
August	4,520	3,495	4,600	3,002	1,990	30,694
September	3,990	3,540	4,550	3,357	2,033	29,960

*Revised.

changed from dark to bright and upon the expiration of the 12 months Reynolds were Johnny-at-the-rathole to get on the list again, and operations were resumed at Longview a few weeks back. Still no lack of customers for aluminum, although it now may take hours instead of minutes for offerings to be taken up.

Non-ferrous Metals

Non-ferrous metal production dropped sharply in November, largely a result of the shutdown of Kennecott Copper Corp.'s Utah properties because of a strike. Other mining operations in the intermountain area were operating close to normal but were being hampered by shortages of skilled manpower.

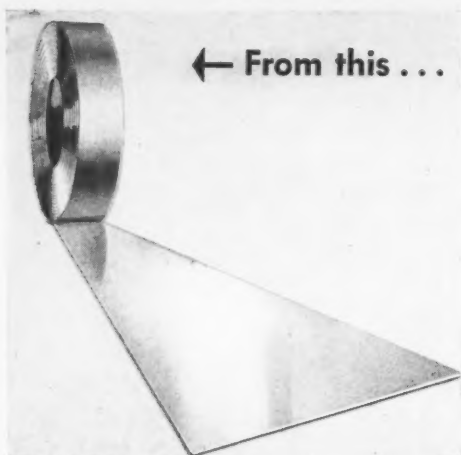
Coal

Bituminous coal production in the Rocky Mountain region is running along at a normal rate for this time of the year. Mines are generally operating a full six-day week except when railroad car shortages interfere. The car supply is slowly improving and the manpower situation is the best it has been for some time. Market demand continues strong.

Oil

Indications are that the pressure is easing somewhat on the nation's oil production. In August and September of this year, U. S. oil

(Continued on page 23)



Mass produced from coiled sheet in **ONE CONTINUOUS OPERATION!**

HOW? Hunter Manufacturing Corporation, Bristol, Pennsylvania, *roll forms* this section of window frame from a Kaiser Aluminum alloy!

It's a typical example of low cost fabrication possible with the uniform high quality and workability of Kaiser Aluminum.

In this operation Kaiser Aluminum coiled sheet is run through a 20-stand roll forming mill. Despite the severe forming done by these 20 rolls in a progressive operation, the completed section is produced in straight lengths, free from cracks and other defects.

As the continuous formed piece emerges—at the rate of 75 feet per minute—a traveling shear cuts it to exact length for final assembly.

What does this mean to you?

In the manufacture of your product, perhaps some parts can be mass produced

by roll forming with the proper alloy of Kaiser Aluminum. If so, chances are you can get these tangible, dollars-and-cents benefits: Lower unit cost—greater uniformity of finished parts—improved surface finish—simplified production scheduling and planning.

And—due to Kaiser Aluminum's *lightness*—you'll get lower handling and shipping costs, reduced worker fatigue, lower labor costs!

But most important, you'll get a better product with Kaiser Aluminum! A product that's strong and durable, that won't rust and that can't be matched for sales appeal.

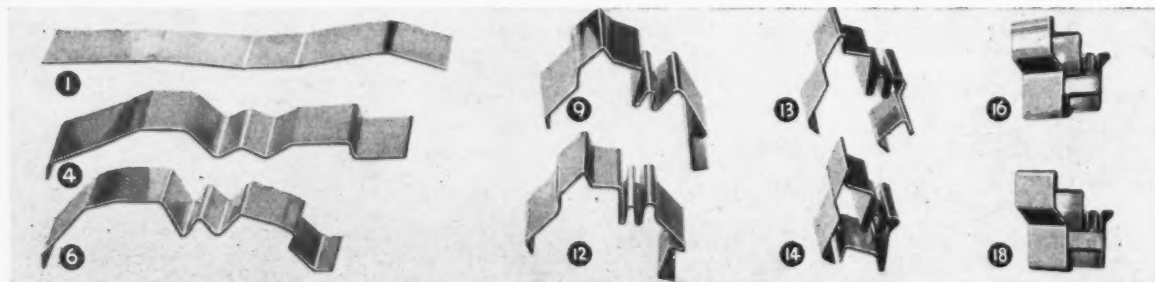
Whether your product is roll formed, spun, drawn, or fabricated by any other method, couldn't *you* lower costs by using the proper alloy of strong, versatile Kaiser Aluminum? Call in a Permanente engineer. He'll help you find the answer!

Permanente Metals

PRODUCERS OF

Kaiser Aluminum

SOLD BY PERMANENTE PRODUCTS COMPANY, KAISER BLDG., OAKLAND 12, CALIFORNIA: OFFICES IN MAJOR CITIES



These cross sections, taken from nine of the 20 stands of a roll forming mill, illustrate progressive stages of fabrication from Kaiser Aluminum

coiled sheet to finished section. In one continuous operation an important part of a window frame is rapidly formed!

THE WESTERN OUTLOOK..News...Statistics...

4

(Continued from page 21)

supply totaled 190,000,000 barrels, against a demand of 175,000,000. A year ago the comparable figures were 181,000,000 against 178,000,000 — a widening of the margin of safety from a scanty 3,000,000-barrel surplus to a recent 15,000,000 barrels.

Predictions are being made that 40,000 wells will be drilled in 1949 in the quest for new sources of petroleum, as compared with 33,000 last year.

World output continues to climb. The East Indies lately have made the greatest strides, although still below their prewar capacity.

West Coast gasoline consumption has been running about 6.4 per cent above last year's level, reflecting population shifts, high level of consumer spending, and new cars again reaching the market in numbers.

Declining shipping activity, including the strike-caused lull, has cut demand for heavy fuel oil, while warm weather this fall curtailed the drain on the supply of home heating oils, stocks of which are not yet comfortably ample.

Lumber

The lumber market in the lower grades has dropped as much as \$18 per 1,000 ft. in the last two months with the present trend still downward. This condition mainly affects the output of a large number of inland Oregon mills.

Those companies able to balance dried common shipments with even limited percentages of uppers are not suffering, although the general softening of the market will affect them in time.

A number of logging camps are shut down due to bad weather in the higher altitudes. Others have closed due to an increased supply of all species of logs caused by the closing of several coast sawmills by the longshore strike.

Plywood

Plywood people state that for the first time in several years it is possible to go into a retail yard and buy plywood over the counter. The price, however, remains fairly strong. Mills were reported late in November to have about four months' stocks of peeler logs on hand, sufficient to make it likely that operations will run clear through the winter.

Pulp

National supply of wood pulp has finally been brought into balance with demand, according to F. G. Stevenot, president, Puget Sound Pulp & Timber Co. New supply of pulp provided by domestic production and imports reached the all-time record figure of 11,276,000 tons in the first nine months of 1948, the total comparing with 10,519,000 tons in the corresponding months of 1947. Pulp receipts in the first nine months of this year not only took care of current demand, but permitted an increase in mill inventories from 642,000 tons at the end of August, 1947, to 765,000 tons in August, 1948.

Building Materials

Building costs in four leading Western cities showed a jump upward in September, 1948, after remaining practically stationary from July to August, according to the American Appraisal Company construction cost index, which covers construction only and does not include building fixture items, such as plumbing, lighting, heating, sprinkler system, etc. The indices, which

do not indicate the relative costs between cities, are as follows:

	(1913 = 100)			
	Prewar	Decontrol	Aug.	Sept.
	Apr. 1939	Nov. 1946	1948	1948
Denver	195	326	450	458
Seattle	196	351	504	521
San Francisco	183	323	450	459
Los Angeles	167	344	479	488

Southern California tile production for the first nine months of 1948 reached a record high of 15,187,800 square feet, reports Verne W. Boget of the Tile Council of America.

LUMBER

(In thousands of board feet)
From West Coast Lumbermen's Association (Douglas Fir, Sitka Spruce, Port Orford Cedar, West Coast Hemlock, Western Red Cedar):

Year through	1946	1947	1948
Production	6,440,224	7,183,788	7,303,589
From Western Pine Association figures (Idaho White Pine, Ponderosa, Sugar Pine and associated species):			
Year through October		1947	1948
Production		2,608,535	2,672,939

From California Redwood Ass'n figures (includes redwoods and whitewoods):
Year through October
Production

	1947	1948
April	147,008	164,862
May	142,400	150,717
June	140,147	156,187
July	107,588	122,386
August	137,042	174,062
September	146,985	181,587

SOFT PLYWOOD

From Bureau of the Census
(In thousands of square feet)

	1947	1948
April	147,008	164,862
May	142,400	150,717
June	140,147	156,187
July	107,588	122,386
August	137,042	174,062
September	146,985	181,587

PULPWOOD

(Pacific Northwest)
(Cords of 128 cu. ft., roughwood basis.
Source: Bureau of Census)

	Receipts	Consumption
April	197,668	276,231
May	170,456	286,221
June	253,075	242,906
July	378,355	275,293
August	426,462	297,414
September	415,948	276,059

STRUCTURAL CLAY PRODUCTS

	UNGLAZED BRICK (In thousands of standard brick)		UNGLAZED STRUCTURAL TILE (short tons)		VITRIFIED CLAY SEWER PIPE (short tons)	
	Mountain	Pacific	Mountain	Pacific	Mountain	Pacific
March	7,229	16,491	2,291	3,088	2,172	15,004
April	8,927	19,008	2,258	2,344	2,458	13,997
May	9,988	22,340	2,595	2,767	2,400	14,565
June	10,504	33,017	4,046	3,119	2,520	15,675
July	11,405	31,389	3,389	2,832	2,369	15,022
August	11,474	31,178	2,232	2,374	2,576	15,022

CEMENT

	—California—		Oregon - Wash.		Utah - Idaho	
	1947	1948	1947	1948	1947	1948
March	1,896	2,049	517	545	313	314
April	1,924	2,105	561	619	409	531
May	1,858	2,003	561	621	493	492
June	1,948	2,087	523	609	492	450
July	1,902	2,128	552	726	487	497
August	1,931	2,152	585	676	435	486

WHEAT FLOUR

(In thousands of sacks; from Bureau of the Census)

	Ore.-Wash.	Montana	Utah	Colorado	California	Total
March	1,288	296	309	501	293	2,687
April	1,496	293	290	471	339	2,889
May	1,535	280	237	454	283	2,791
June	1,427	295	317	481	366	2,886
July	1,664	344	289	424	379	3,100
August	1,616	367	343	495	355	3,176

CONFECTIONERY AND COMPETITIVE CHOCOLATE PRODUCTS

(From Bureau of Census)

	—CALIFORNIA—		—WASH. - OREGON -		—CALIFORNIA—	
	Sales	Per Cent Change	Sales	Per Cent Change	Sales	Per Cent Change
Month		For Year to Date		For Year to Date		For Year to Date
August	359	—16	398	—28	1,982	+2
September	593	—8	599	+15	2,156	+3

HOUSEHOLD FURNITURE

Manufacturers' Shipments—11 Western States
From Bureau of the Census
(In thousands of dollars)

	Upholstered Furniture	Other Household Furniture	Total
3rd quarter, 1947	\$11,047	\$15,929	\$26,976
4th quarter, 1947	13,336	21,098	34,434
1st quarter, 1948	10,633	20,739	31,372

Chemicals

Two chemicals that have been under depressed prices for years on account of severe competition have finally begun to rise, due to the inexorable pressure of costs. Sulphuric acid, which has been below 1932 prices ever since that year, has now crept up slightly above the depression level. Papermakers' alum, which failed to bounce up when the OPA restrictions were removed, also has finally put on a delayed action act.

Canning and Packing

Canned fruit stocks piled up in canners' warehouses all fall because of the maritime and warehouse strike, leaving canners in strapped financial position for the time being, but the demand is considered sufficiently strong to take everyone through until next season without casualty.

California stocks on hand as of Nov. 1 were reported by the Canners League as follows, on No. 2½ can basis:

	1947	1948
Peaches, cling	5,938,666	9,658,582
Peaches, free	653,632	1,056,602
Fruits for salad	134,421	580,169
Fruit cocktail	3,164,158	6,987,434
Mixed fruits	226,018	106,411
Apricots	(not available)	3,283,857
Sweet cherries	"	52,255

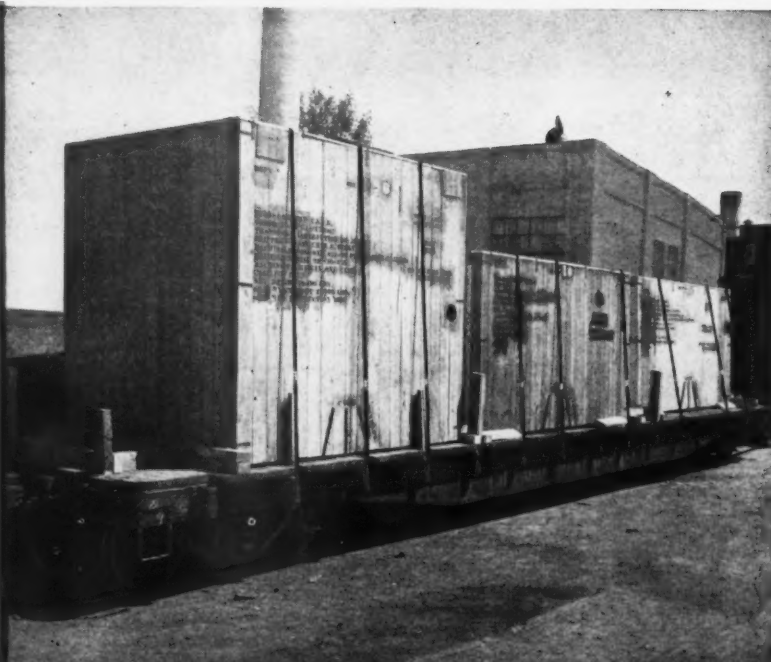
California canned freestone pack for 1948 was 1,658,979 cases, compared with 1,497,286 cases in 1947. It was the largest freestone pack in seven years, but still under the record figure of 2,151,000 cases in 1941. California canners handled 173,000 tons of pears in the 1948 season, compared with a record tonnage of 181,000 tons in 1947. Resistance among canners against the use of hormone spray on pears by growers seems to be developing. Fall spinach pack was light, on account of poor growing conditions.

Oregon - Washington - Idaho freestone pack was 663,292 cases, a big drop from the 1,027,492 cases packed in 1947. Northwest canned plums also were off in volume, 878,846 cases, against 1,812,363 cases for 1947.

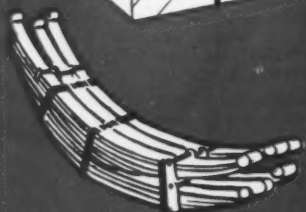
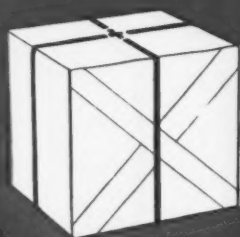
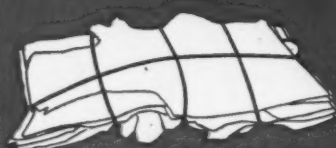
New records have been set by California quick-freezers in lima beans. Fordhooks totaled 37,958,031 pounds, about 15 per cent above 1947. Baby limas were 5,902,546 lbs. against 3,543,033 pounds in 1947.

California Fruit Growers Exchange still contends that canned orange juice is mostly a

(Continued on page 25)



The man who saves more than he sells!



Any shape, any size, any product travels better with Signode Steel strapping.

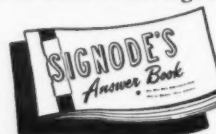
The white silhouette above is a composite Signode packaging and shipping engineer. His job is to help you improve your shipping methods . . . through the application of Signode's *Six-Point System of Planned Protection*.

Here's what that system comprises:

(1) A thorough study of your shipping practices to determine where Signode Steel Strapping Methods and Equipment can benefit; (2) a complete interchange of ideas and information with your plant personnel to insure the success of any new methods introduced; (3) recommendation of the strapping, tools, and accessory equipment best suited to your needs; and a determination of whether or not the services of Signode's packaging laboratory are required; (4) careful instruction of operators in the proper use of strapping and tools; (5) a periodic recheck of methods introduced, with your personnel as well as with carriers and receivers as required; (6) fast tool repair and replacement, regular personal contacts, and a bulletin service that keeps you abreast of latest developments in packaging and shipping.

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STEEL STRAPPING PROTECTS YOUR SHIPMENTS AGAINST DAMAGE

THE WESTERN OUTLOOK (5)

(Continued from page 23)

"lemon." Reports at the annual meeting that 35 per cent of the total national orange pack is in canned form also stated that this is only a salvage operation on small sized fruit. The Exchange sold 600,000 gallons of concentrate to Great Britain in 1948 and 250,000 gallons for the school lunch program in the United States.

Flour

Ending of the maritime strike has sent flour out of Pacific Coast ports again, and the PMA and army and navy are buying to some extent, but the general picture has not brightened up particularly. Packaged flours were slow moving in December on account of inventory time. Feed items have been rather slow, although as good as last year, except for turkeys, where there was big production and good profits for the farmers.

Sugar

C&H's cane refinery at Crockett, Calif., largest in the world, got into action fast when the maritime strike ended early in December, as there were 100,000 tons of sugar afloat in the holds of ships in San Francisco Bay waiting to be unloaded. A little had also backed up in the Hawaiian Islands, and some of the mills in the islands ran through December. Production is nearly up to estimates, but not up to the original quota allotted by the government.

Beet sugar outlook for 1949 continues poor, and if the 1948 consumption estimate, which was to be released by the Department of Agriculture in December, is 7,300,000 tons or higher the effect on the market and the growers will be bearish. Crop reports as of Nov. 1, 1948, were lower than estimated, California having 2,848,000 tons of beets, Colorado 1,390,000 and Idaho 1,262,000. The Idaho yield in particular has fallen off. The crop reports of Nov. 1 add up to a total of 1,300,000 tons of sugar, raw value, as compared with 1,800,000 tons in 1947. The beet sugar quota for 1948 was 1,800,000 tons, and the shortage of 500,000 tons was turned over to Cuba and a few other countries like Peru and San Domingo to fill, with Cuba getting about 95 per cent of it. Amalgamated Sugar Co. and Utah-Idaho Sugar Co. have notified growers they will receive \$1.25 to \$1.50 less per ton for their 1948 crop than in 1947.

Apparel

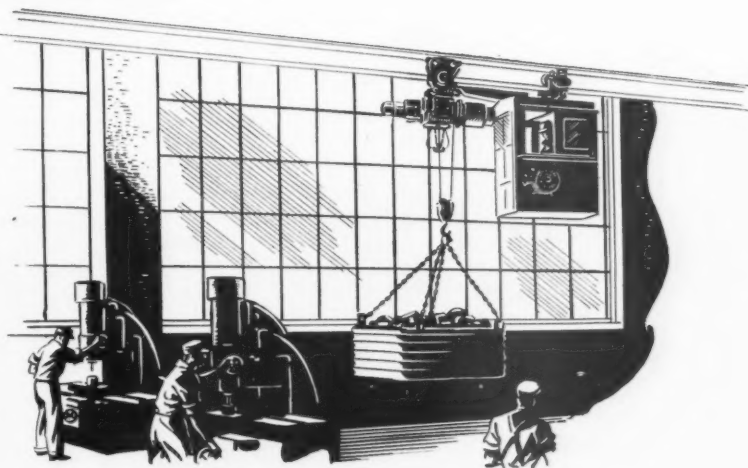
Industry men still are eyeing raw materials markets in lively hope of important changes. Cotton textile mills say their lowered prices are virtually at the break-even point, with a still narrower profit margin probable because of wage rises, government support to raw cotton, and other irreducible costs. But inventories of many goods are known to be large and sales volume has declined over a long period.

Geographical factors again are putting their prewar pressure on Western apparel industries, tending to drive manufacturers out of the standard clothing lines into specialty and style goods. A stylist from Macy's in New York told some 2,500 buyers, fabric men and men's wear manufacturers at a Palm Springs, California, merchandising forum that "with the present drive on stock turnover and liquid position in retail stores, it is becoming increasingly difficult for eastern buyers to purchase staple goods from a point 3,000 miles away."

The Menswear Manufacturers and the Boys Apparel Guild, sponsoring the annual forum, heard a transcribed round-up of trade leaders from many U. S. points voicing the need by Coast producers for stressing Western styles, with intensive promotion; for better control of

(Continued on page 27)

MOVE LOADS THE FAST WAY



The Safe. Economical Way THROUGH THE AIR!

Modern materials handling systems use "through the air" movement wherever possible because of greater speed, economy and safety.

Analysis of specific problems will indicate need for the work characteristics of overhead cranes, floor or cab operated hoists, or a well planned combination of these lifting tools.

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3. Other natural resources
4. Favorable labor conditions because of friendly relationships between industry, management and labor
5. Ideal climate and exceptionally favorable working conditions
6. Nevada's tax structure:
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 - No Sales Tax
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I respectfully suggest that you investigate the opportunities and advantages Nevada offers industry for investment and expansion.

Cordially yours,

Vail Pittman
Governor



Vail Pittman

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

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UNION PACIFIC RAILROAD

Road of the Daily Streamliners

THE WESTERN OUTLOOK (6)

(Continued from page 25)

inventories, confining re-orders to quantities needed to keep stocks reasonably intact; and for otherwise abandoning practices held over from war times.

One store manager said women spent \$9,000,000,000 on clothing and accessories in 1947 while men spent only \$5,000,000,000. Moral for manufacturers: Train men to be more style-conscious; offer more radical departures in clothing styles, speeding up purchases by faster style changes.

Meeting the price problem head-on, a plane-load of San Francisco stylists meanwhile flew 300 models of Golden Gate fashions to New York for the first major fashion invasion of the east. The 3,000 buyers were feted with gardenias and bottles of California champagne and shown garments ranging from \$5.95 to \$79.95, or somewhat less than comparable New York models.

APPAREL

(In thousands of dollars)

Total Women's, Misses' & Juniors' Outerwear

	Los Angeles	San Francisco
May	4,505	1,781
June	4,188	1,383
July, August, September	23,245	6,699
Oct., Nov., Dec.	24,948	6,844
Jan., Feb., March	30,173	7,897
Apr., May, June	19,052	4,521

	Men's Overalls (thousands of dozens) California	Men's Wool Work & Dress Trousers (thousands of units) California
January	34.4	90.7
February	26.8	85.3
March	33.0	109.6
April	29.0	92.6
May	27.7	86.3
June	30.4	76.1
July	26.2	66.5

Aircraft

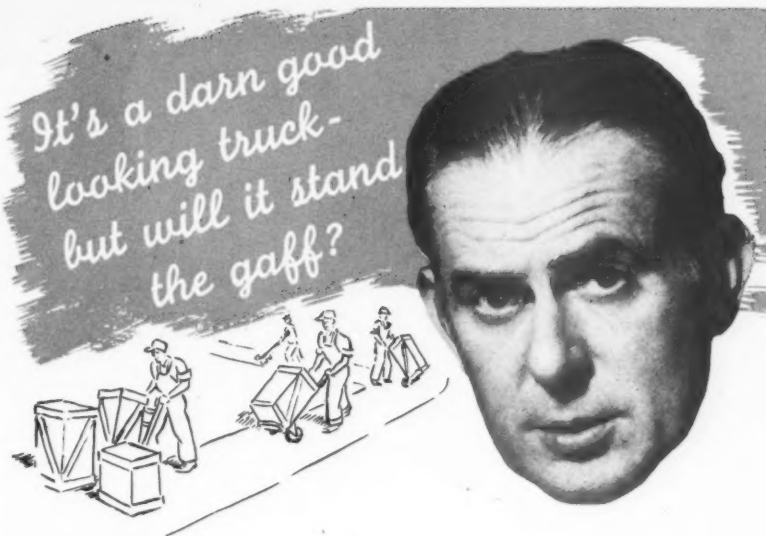
Up-sloping production schedules are slightly fattening airplane factory payrolls, chiefly in engineering, design, radar, and other pre-production departments. It will be early 1949 before growth in assembly operations will become impressive.

Major aircraft makers have nearly finished putting their financial houses in order. Tax claims and rebates which last year saved most companies from showing whacking big losses have been mostly absorbed. Thanks to 70-group military orders, late earnings reports show most firms in the black. Flourishing most are Northrop, busy on ultra-advanced developmental programs, and some of the small makers of specialties and accessories.

The "flying stovepipe" ram-jet engine is emerging into a tangible factor in the aircraft power plant field. General Tire and Rubber's newly purchased subsidiary, Marquardt Aircraft, is being quadrupled in staff to handle a backlog already topping \$2,500,000. Lockheed has been testing ram-jets mounted on wingtips of the F-80 Shooting Star to take over at speeds above 250 miles an hour. Marquardt also is developing the pulse-jet helicopter, another radical innovation.

A new era in quiet air transport is promised by an aircraft engine silencer now under test at Northrop Aeronautical Institute for CAA approval.

Mid-Continent area is becoming active, with Convair scheduled to subcontract the Northrop Flying Wing at Fort Worth, Texas, and Boeing readying its Wichita plant, which built most B-29's during the war, for its successor, the six-engine Stratojet. Floyd Odum, financier now powerful in Convair operation, is seeking a \$40,000,000 RFC loan to assist a company which he proposes will finance conveyor transports and lease them to air lines.



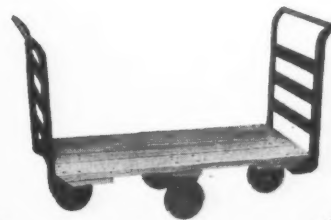
YOU'RE RIGHT, sir! You can't buy hand trucks on looks alone. They've got to be made for rough wear — sturdy enough to carry the full weight of the load, day in and day out.

Colson Hand Trucks are built right! You can bet on that. Take the Colson Heavy Duty Truck No. 6075 for example. It's got annular ball bearing wheels that really stand up under heavy loads. Rolls extra easy too. There are heavy pipe push handles, smooth to the touch, curved just right for a quick comfortable grasp. Full riveted construction adds years of service. The heavy

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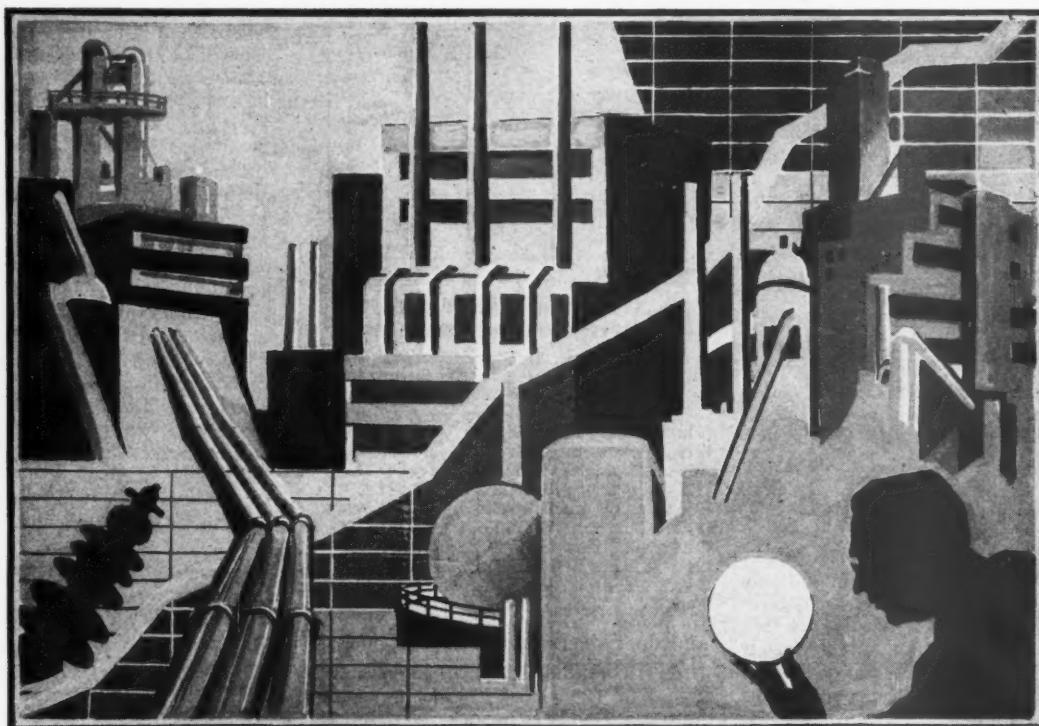
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THE INDUSTRIALIZED WEST . . . This first ANNUAL REVIEW AND FORECAST NUMBER of "WESTERN INDUSTRY" is intended as a study of factors and trends in Western industrial development, to give our readers assistance in determining for themselves the economic outlook for both the immediate future and the long range picture.

The World Moves West:

'Western Industry' Takes Stock Of Today's Regional Trends

WHERE is the West heading? To begin with, it must be recognized that the West is in the process of building a new economic house for itself, to catch up with the immediate needs of some 18 millions of people, more than four millions of whom were not here before the war.

It is also evident on close observation that the foundations of this industrial and commercial edifice are, consciously or unconsciously, being laid deeper and heavier than today's business alone warrants, in order to carry an even greater superstructure.

Why? Because the Westward movement of population was not war-made, but merely an acceleration of a long-time trend. And U. S. Census Bureau estimates indicate that the wartime acceleration has continued unabated ever since the peak of wartime employment was passed in August, 1943.

"People make markets, and markets make industry," goes the popular saying. To which it may be added that industry attracts more industry — satellite, supplementary and competitive. Heavy industry requires a broad population base for support, and although the sudden arrival of

heavy industry in the West in response to the war's demand seemed at that time to be premature for the expected postwar economy, it was found soon afterwards, rather surprisingly for most people, that heavy industry's postwar day in the West was already dawning.

A recapitulation of some of the outstanding Western industrial developments of 1948 will be found on pages 36 to 38 of this issue. But, in order to gain a better perspective of the general situation, *Western Industry* first invites its readers to consider the application to the West of 11 fundamentals which seem to be requisite

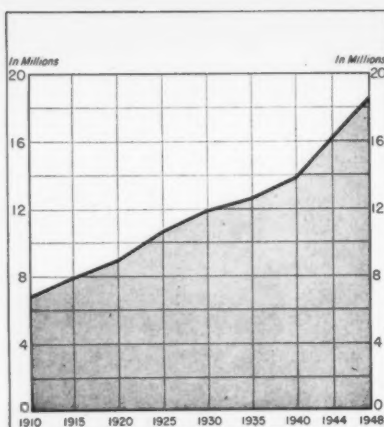
to the development of an industrial economy, as follows:

1. Population.
2. Water.
3. Fuel and energy.
4. Materials.
5. Capital.
6. A manufacturing philosophy.
7. Management "know how" and organization.
8. Research.
9. Labor skills.
10. Markets.
11. Transportation.

Population

The story of the West's growth is told in the map, chart and tables on this page and the one opposite. In 38 years the population of the eleven Western states has trebled, with an average rate of increase for the period of around 308,000. If one chooses to disregard the 1940-1948 period as "distortionary" and takes only the years from 1910 up to 1940, the rate of growth is still more than 235,000 annually. It is also important to note that in only one period, from 1930 to 1935, has the five-year increase ever dropped below 1,000,000.

As the map shows, the West has outstripped the rest of the country in the last eight years, not only in percentage rate of growth, but even more significantly, in actual numbers. If this were to continue without interruption, it would not take many years for the West to bulk heavily against the rest of the country in total population. Projecting the population as of the year 1960 may be logically done by



STEADY GROWTH OF THE ELEVEN WESTERN STATES

(From U. S. Census Bureau)

	Estimated population	Increase from previous 5-yr. period
1910	6,884,804	
1915	8,018,285	1,133,481
1920	9,060,307	1,042,022
1925	10,677,775	1,671,468
1930	11,949,384	1,271,609
1935	12,686,759	737,375
1940	13,959,888	1,273,129
1944 ^a	16,351,595 ^a	2,391,707 ^a
1948 ^a	18,656,000 ^a	2,304,405 ^a

^aFour-year period.

using three different yardsticks, as follows:

(1) Taking the 1910-1940 annual rate of increase (235,000), in order to avoid the war and postwar periods, the next 12

years would supply 2,820,000 more people, or a total population of 21,476,000.

(2) Using the 308,000 annual rate for the entire 1910-1948 period, the increase would be 3,696,000 and total 1960 population 22,352,000.

(3) Assuming that the accelerated growth between 1940 and 1948 of 587,000 a year will be maintained, the additional population would be 7,044,000, or a total in 1960 of 25,700,000.

Water

Although the greatest increase of population in the West has taken place in areas of least natural water resources, nevertheless the supply for agricultural and domestic purposes is reasonably adequate for the immediate future throughout the West except in Arizona, where successive drought years have depleted the storage reservoirs. It is widely stated that the future growth of southern California is definitely limited by water, but actually the Metropolitan Water District, which serves most of the area, is at present only using about half of its allotted portion of the Colorado River, and does not have pumps and other facilities installed to use the remaining half.

Northern California's water problem for the next decade is well taken care of by the Central Valley Project, although this will not permit any new acreage to come under irrigation. If water from the Trinity and Klamath rivers in the extreme northern part of the state were to be brought into the CVP system, it would be possible to add to southern California's supply by diverting water from the Isabella dam on the Kern River in the southern Sierra Nevada mountains.

Much development in Arizona will follow the proposed Parker Dam on the Colorado, but the distribution system entailed will run the total cost of the project up to \$738,000,000. The character of the arid eastern Washington area also will be greatly changed when the Grand Coulee project is completed five years hence, making possible the irrigation of 1,250,000 acres of land.

Treatment of sewage and industrial wastes may add considerably to local water supplies in California. Looking still further ahead, serious study is being given in some of the universities to the possibility of reclaiming sea water, which is not nearly as fanciful as it may sound. Grandiose plans for transferring Columbia River water to southern California also are being nursed by the U. S. Reclamation Bureau.

Supply for new process industries using large volumes of water is actually a difficult problem in California today. This is one of the obstacles to be surmounted in attracting new industrial operations of this type, such as textile plants.

Fuels and Energy

Future needs of the West for electric power are set forth in the chart on page 32 of this issue. Developed supply, how-



THE WEST'S GROWTH FAR OUTSTRIPS REST OF COUNTRY

Civilian Population—from 1940 U. S. Census, and U. S. Census Bureau Estimates for 1948

	April 1, 1940	July 1, 1948	NUMBER	PER CENT
Northeast	35,938,020	38,993,000	3,055,000	8.5
North Central	40,118,881	43,750,000	3,631,000	9.1
South	41,521,487	44,107,000	2,586,000	6.2
West	13,823,597	18,440,000	4,616,000	33.4
Total U. S.	131,401,985	145,290,000	13,888,000	10.6

Western States Climb Nearer the Top

ever, has barely kept pace with demand since the war, due partly to inability of manufacturers to supply generators rapidly enough, but in even greater measure to the astonishing increase in demand.

By setting up two power pools, one in the Pacific Northwest, the other in the Pacific Southwest, the public utility systems were able to provide enough electric power to go around through the 1948 season, except for the late fall in the Pacific Northwest. There the aluminum reduction plants were cut back about 20 per cent in some of the peak periods, and other controls began to be set up.

Installed capacities, Sept. 30, 1948: Montana-Idaho, Utah-Oregon-Washington (interconnected companies), 3,518,000 kw.; northern California, 2,090,000 kw.; southern California, 2,320,000 kw.; Arizona, 300,000 kw. Installed capacity of 8,246,000 kw. on June 30, 1948, for this area (less Montana and plus Nevada) will be increased to 3,611,000 kw. by Dec. 31, 1951.

Federal Power Commission forecasts

are as follows: Montana, possibility of a surplus by 1950. Utah-Idaho, shortage of 3,000 kw. in 1949, which may be relieved by purchasing power from Kennecott Copper Co., supply equal to demand in 1950. Washington-Oregon: Reserves dangerously low in 1949-50, but should be able to get by if loads do not increase too rapidly; under adverse conditions of water flow or equipment break-downs, shortages may develop. (Completion of the McNary Dam on the Columbia River in 1955 will bring in new hydro power equal to Bonneville's output). Northern California: If the spring of 1949 is dry, it will be a close call. Southern California: Surplus of power until 1944, northern California and Arizona being helped out. Arizona: Shortage until 1950.

Both ends of California have much more electric power in sight. Shasta Dam in the north has a large amount of undistributed power awaiting settlement of the controversy between the Reclamation Bureau and the Pacific Gas & Electric Co. over use of the latter's distribution system, and in 1951

Figures for Population Ladder Below

1940			1948			Increase or Decrease from 1940 to 1948	
Rank	State	Population	Rank	State	Population	Number	Per Cent
1.	New York	13,462,417	1.	New York	14,357,000	+894,000	+6.6
2.	Pennsylvania	9,895,880	2.	Pennsylvania	10,676,000	+780,000	+7.9
3.	Illinois	7,887,193	3.	CALIFORNIA	9,894,000	+3,037,000	+44.3
4.	Ohio	6,905,058	4.	Illinois	8,622,000	+734,000	+9.3
5.	CALIFORNIA	6,857,370	5.	Ohio	7,788,000	+883,000	+12.8
6.	Texas	6,389,349	6.	Texas	7,153,000	+764,000	+12.0
7.	Michigan	5,252,879	7.	Michigan	6,189,000	+936,000	+17.8
8.	Massachusetts	4,313,799	8.	Massachusetts	4,704,000	+391,000	+9.1
9.	New Jersey	4,156,594	9.	New Jersey	4,691,000	+534,000	+12.9
10.	Missouri	3,783,748	10.	Missouri	3,945,000	+161,000	+4.3
11.	No. Carolina	3,566,133	11.	Indiana	3,907,000	+480,000	+14.0
12.	Indiana	3,427,389	12.	N. Carolina	3,675,000	+109,000	+3.1
13.	Wisconsin	3,137,184	13.	Wisconsin	3,307,000	+170,000	+5.4
14.	Georgia	3,099,199	14.	Tennessee	3,140,000	+224,000	+7.7
15.	Tennessee	2,915,532	15.	Georgia	3,104,000	+5,000	+0.2
16.	Kentucky	2,840,881	16.	Virginia	2,975,000	+325,000	+12.3
17.	Alabama	2,821,498	17.	Minnesota	2,938,000	+146,000	+5.2
18.	Minnesota	2,791,928	18.	Alabama	2,839,000	+17,000	+0.6
19.	Virginia	2,649,572	19.	Kentucky	2,793,000	-48,000	-1.7
20.	Iowa	2,537,596	20.	Iowa	2,624,000	+87,000	+3.4
21.	Louisiana	2,359,349	21.	Louisiana	2,556,000	+206,000	+8.7
22.	Oklahoma	2,332,800	22.	WASHINGTON	2,453,000	+721,000	+41.6
23.	Mississippi	2,183,400	23.	Oklahoma	2,352,000	+19,000	+0.8
24.	Arkansas	1,948,036	24.	Florida	2,320,000	+429,000	+22.7
25.	West Virginia	1,901,918	25.	Maryland	2,118,000	+305,000	+16.8
26.	Florida	1,890,831	26.	Mississippi	2,112,000	-72,000	-3.3
27.	S. Carolina	1,885,826	27.	Connecticut	2,008,000	+301,000	+17.6
28.	Maryland	1,813,022	28.	S. Carolina	1,960,000	+74,000	+3.9
29.	Kansas	1,796,933	29.	Kansas	1,953,000	+156,000	+8.7
30.	WASHINGTON	1,732,313	30.	Arkansas	1,923,000	-25,000	-1.3
31.	Connecticut	1,706,854	31.	W. Virginia	1,915,000	+13,000	+0.7
32.	Nebraska	1,314,234	32.	OREGON	1,625,000	+536,000	+49.3
33.	Colorado	1,121,510	33.	Nebraska	1,297,000	-17,000	-1.3
34.	OREGON	1,088,460	34.	Colorado	1,151,000	+29,000	+2.6
35.	Maine	845,153	35.	Maine	897,000	+52,000	+6.1
36.	Rhode Island	707,846	36.	Rhode Island	742,000	+34,000	+4.8
37.	S. Dakota	642,865	37.	ARIZONA	654,000	+156,000	+31.4
38.	N. Dakota	641,874	38.	UTAH	652,000	+102,000	+18.6
39.	Montana	559,380	39.	S. Dakota	620,000	-23,000	-3.6
40.	UTAH	550,059	40.	NEW MEXICO	561,000	+29,000	+5.5
41.	NEW MEXICO	531,785	41.	N. Dakota	559,000	-82,000	-12.8
42.	Idaho	524,873	42.	N. Hampshire	545,000	+55,000	+11.2
43.	ARIZONA	497,864	43.	Idaho	530,000	+5,000	+1.0
44.	N. Hampshire	490,626	44.	Montana	509,000	-51,000	-9.0
45.	Vermont	358,851	45.	Vermont	374,000	+15,000	+4.1
46.	Delaware	266,123	46.	Delaware	297,000	+31,000	+11.6
47.	Wyoming	249,861	47.	Wyoming	270,000	+20,000	+8.0
48.	Nevada	110,122	48.	Nevada	141,000	+31,000	+28.1



the south will have 225,000 kw. from the new Davis Dam on the Colorado River.

There is considerable prospect of much of the future energy in California being developed from steam plants fired by coal. This would make unnecessary to a considerable extent the enormous capital costs of hydro power, and also lessen the dependence of industry on federal largesse.

The aluminum industry takes from one-fourth to one-third of the total power load of the aggregate public utility system in Oregon and Washington. Availability of an ample supply of cheap hydro-electric power is what brought aluminum to that area, but Aluminum Company of America has turned to the natural gas fields of Texas for steam-generated electricity for its latest reduction plant. Whether this is a threat to further aluminum expansion in the Northwest remains to be seen.

OIL. The big differential in oil and nat-

ural gas prices enjoyed by industry on the Pacific Coast over the rest of the country seems to be on the wane. By 1951 the demand in the three Coast states, Nevada and Arizona, is expected to top 1,000,000 barrels of oil daily, and California's fields will no longer be able to supply all their needs (unless Richfield's new Cuyama discoveries change the picture), requiring the importation of higher-priced oils from other areas. Oil now is 28 per cent cheaper on the Pacific Coast than in New York, and 14 per cent cheaper than the Gulf coast.

Standard of California is building five 240,000-barrel tankers, 60 per cent larger than anything heretofore afloat, to bring oil from Venezuela, and a group of other companies headed by Shell have proposed a pipeline from western Texas to southern California of 150,000 to 300,000 barrels daily capacity. The Rocky Mountain area

is increasingly active, and Standard of California has piped oil from the Rangely field of Colorado to Salt Lake City, from which point the Spokane area is also being served.

Petroleum from the oil shales of Colorado, Wyoming and Utah is being investigated by the government and oil companies, without proof yet that it is commercially feasible. Gasification of coal is being tested out in the east, but not yet in the West.

NATURAL GAS. Population growth has swallowed up the original oversupply in California, and industry's highly favorable rates are now being badly pinched, while industrial users not on the higher-priced firm contracts have had some interruptions of service. Gas is being imported from west Texas. The first line, already completed, will provide southern California 305,000,000 cubic feet early this year and 405,000,000 next year. The second line, to be in service in 1951, will give northern California 137,000,000 cubic feet additional that year and 444,000,000 by 1955. Unfortunately for industry, the Pacific Gas & Electric Company will use 118,000,000 cubic feet of the 1951 deliveries itself to serve its steam-electric plants, and 164,000,000 of the 1955 capacity. Northern California's production of natural (dry) gas is estimated as good for 20 years more (now about 480,000,000 cubic feet), but southern California's oil field gas (500,000,000 cubic feet) will hold out longer. A project to bring natural gas from Alberta into the Pacific Northwest is still indefinite.

COAL. The western half of the United States has an almost unlimited supply of bituminous coal of varying grades. Large industries on the Pacific Coast, such as electric utility systems, cement mills and sugar refineries, are giving it serious consideration as a future industrial fuel supply.

ATOMIC ENERGY—This is still the \$64 question as far as peacetime use is concerned, and the authorities generally agree that industrial applications are a decade or more away, at the earliest.

Nevertheless the West still has the enormous Hanford Engineer Works on the upper Columbia River, where atomic bombs were made. G-E is now operating the plant for the government.

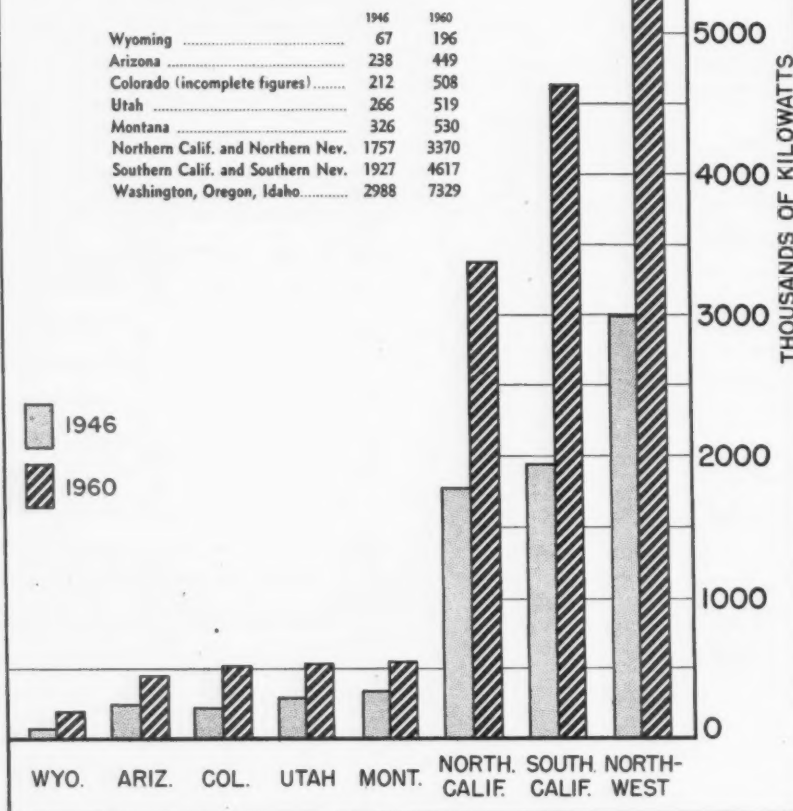
Materials

STEEL. West Coast and Utah steel output has trebled since before the war, yet under today's conditions of a world-wide shortage of steel the Far West is even more of a deficit area than ever, because so many eastern and Middle West mills have withdrawn from the Coast market in order to protect their customers nearer home. The adoption of mill basing also makes it more difficult for the distant mills to serve this area.

For example, 18 producers of pipe were selling to Coast customers before the war; now there are only about four. In Salt Lake City before the war steel buyers had the option of doing business with U. S. Steel,

Future Needs For Electric Power Heavy

Comparison of Peak Demands, in Thousands of Kilowatts—Figures From Federal Power Commission



Bethlehem, Jones & Laughlin, Inland and others; today Geneva is the only supplier except for specialty items that cannot be supplied locally.

Here is the comparative Western steel-making capacity, prewar and postwar, in net ingot tons:

	1941	1948
California	1,044,920	2,101,200
Washington	197,400	346,800
Oregon		66,100
Utah		1,283,400
Total	1,242,320	3,797,500
Colorado	1,127,850	1,268,640

Colorado steel is not sold to any great extent west of the Rockies except in the form of wire products, nails, etc. A wide range of steel products is now available from the mills of Utah and the Pacific Coast states, in fact practically everything but stainless and various alloys, but sheet, tinplate and pipe facilities are insufficient to meet the demand, despite Columbia's new tinplate mill at Pittsburg and Kaiser's pipe mill at Fontana.

Proven reserves of iron ore in Utah are estimated by the Bureau of Mines at 100,000,000 gross tons of more than 45 per cent iron, with an additional 250,000,000 gross tons inferred.

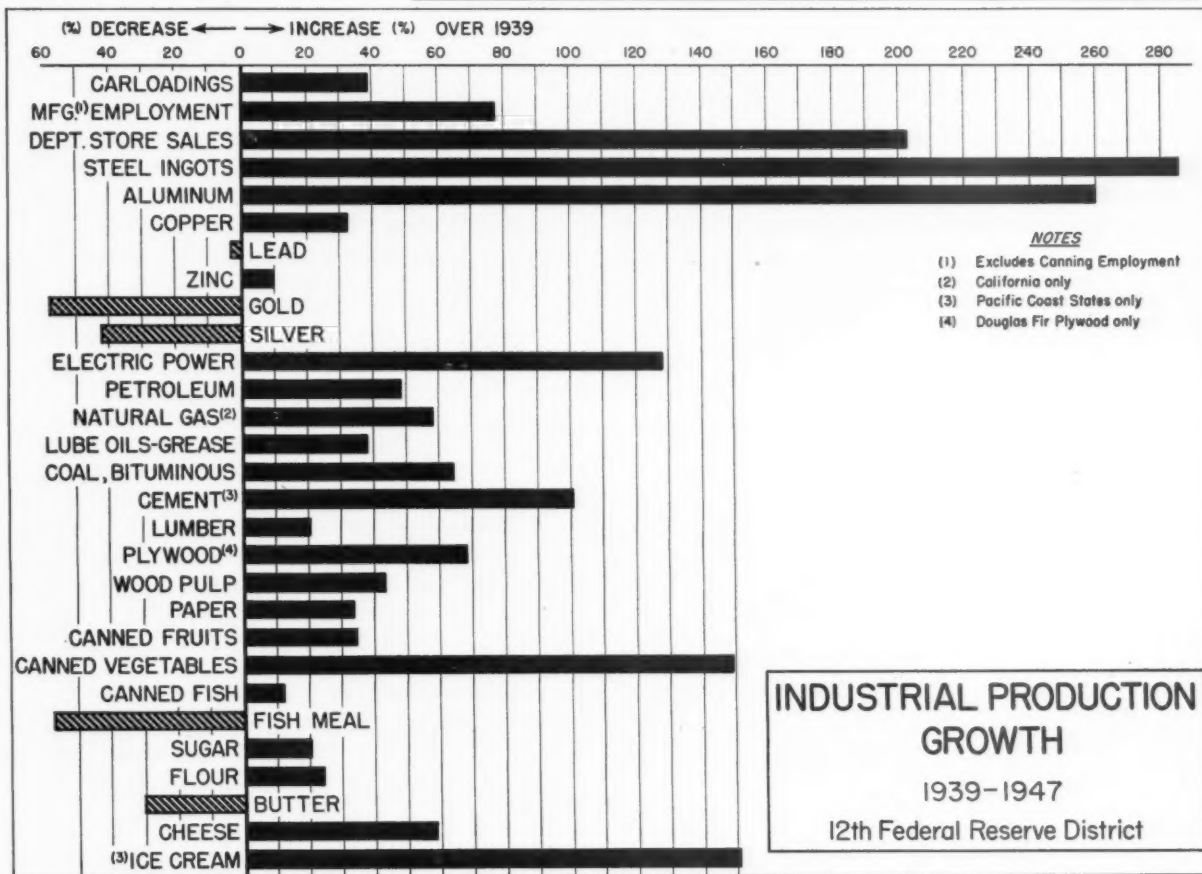
Immediate reserves in the Eagle Mountain deposit in southern California from which Fontana's supply of iron ore is now coming are estimated by the Bureau of

TOTAL INDUSTRIAL PRODUCTION TWELFTH DISTRICT, 1939 AND 1947

(In Thousands of Units)

(COMPILED BY FEDERAL RESERVE BANK)

Item	1939 Amount	1947 Amount	Unit	Increase	% Incr. or Dec.
Carloadings	2,598	3,506	cars loaded	1,008	38.9
Mfg. employment (excl. can'g empl.)	6,753	12,002	persons	5,249	77.7
Dept. store sales.....	\$481,250	\$1,456,996	dollars	975,746	202.7
Steel ingots	791	3,050	net tons	2,259	285.5
Aluminum	0	260	short tons	260	260.0
Copper	516	684	short tons	168	32.5
Lead	178	173	short tons	-5	-2.8
Zinc	105	211	short tons	106	10.0
Gold	2,691	1,122	fine ounces	-1,569	-58.3
Silver	43,268	24,911	fine ounces	-18,357	-42.4
Electric power	19,189,000	43,734,000	KWH	24,545,000	127.9
Petroleum (crude)....	224,354	333,103	barrels	108,749	48.8
Natural gas (Calif. only).....	348,361,000	551,786,000	cu. ft.	203,425,000	58.5
Lube oils and grease..	3,295	4,566	barrels	1,271	38.5
Coal (bituminous)....	5,014	8,245	net tons	3,231	64.4
Cement (Pac. Coast states only)...	13,844	28,707	barrels	14,863	100.7
Lumber	11,506,300	14,887,200	bd. ft. measure	3,380,900	20.6
Plywood (Douglas plywood only)	950,000	1,600,000	sq. ft. panel basis	650,000	68.4
Wood pulp	1,414	2,030	short tons	616	43.5
Paper	1,108	1,484	short tons	376	33.9
Canned fruits	30,800	41,511	cases (2½ can basis)	10,711	34.7
Canned vegetables	20,609	51,350	actual cases	30,741	149.1
Canned fish	13,722	12,036	standard cases	1,686	12.2
Fish meal	130	55	tons	-75	-57.6
Sugar	1,354	1,630	short tons	276	20.3
Flour	12,963	16,108	barrels	3,145	24.2
Butter	182,509	117,220	lbs.	-65,289	-30.3
Cheese	100,480	159,504	lbs.	59,024	58.7
Ice cream (Pacific Coast states only)...	26,569	66,610	gallons	40,041	150.7



Mines at 21,600,000 tons of 51.2 per cent iron, and potential reserves of 70,000,000 tons of 40 per cent or more iron.

Both Geneva and Fontana obtain their coking coal from an ample supply in the Sunnyside district of Utah. Scrap supply is the most serious materials problem of today, as the 1949 needs for both the steel and foundry industries are estimated at 2,394,000 net tons, or three times pre-war volume, with the supply diminishing.

LUMBER. In 1945 the Pacific Northwest's timber resources were estimated at 664,400,000,000 feet. It is predicted that they will drop to 500,000,000,000 by 1960, and remain at approximately that level from then on, as the result of replantings of logged-off lands and the sustained yield programs into which the larger lumber operators are entering. Improved utilization of wood now wasted also will be a factor.

COPPER. More than 80 per cent of the nation's output of copper comes from the Western states, with Arizona the leading producer. All of this has been shipped eastward in the form of "blister" copper, which requires further refining before it can be utilized by processors, but the growth of population and industry in the West, with its even greater prospects for the future, have justified Kennecott Copper Company in announcing plans for an \$18,000,000 refinery at Salt Lake City to serve the needs of processors in the Coast and Intermountain area.

ALUMINUM. Over 50,000,000 pounds of ingots are now being produced monthly at the reduction mills of Alcoa, Reynolds and reduction mills of Kaiser, Reynolds and Alcoa in the Pacific Northwest, and around 20,000,000 pounds of sheet aluminum from the Kaiser rolling mill at Spokane. Lack of additional supply of electric power holds back further expansion of the industry in the Northwest. The West has become the consumer of about a third of its own aluminum output, partly as a result of the government's aircraft program, but also through the education of fabricators in wider uses for aluminum.

LEAD AND ZINC.—The Western states produce at the present time about four-fifths of the national output of lead and three-fifths of the zinc.

FOOD PRODUCTION.—The West, particularly the Pacific Coast states, has always been the outstanding fruit processing area of the country, because it is the only region where climatic conditions insure a dependable supply of deciduous fruits. Since 1936 it has also been responsible for an increasingly large proportion of the national output of canned vegetables. The area overwhelmingly dominated the canned fruits picture until recently, when the rise of citrus juices in Florida and Texas began to cut in somewhat. Practically all of the

dried fruit comes from the Pacific Coast. There has been a great increase in canned vegetables in the West in the last 15 years, caused by the discovery of the Pacific Northwest as a good pea canning area, and the wartime increase in canned tomatoes and tomato products of which the West is now responsible for more than 25 per cent of the total output. The late stiff advances in freight rates make it likely that the tomato products will be shipped mostly in concentrated form, and this may even extend to other vegetables and fruit.

On the bright side of the freight picture, a big development in canned corn in the West is likely, to avoid westbound freight costs.

Probably 60 per cent of the frozen fruits and vegetables are processed on the Pacific Coast.

The Western states are by far the largest producers of beet sugar, and a number of new refineries have been built in the last five years. All of the cane sugar from the Hawaiian Islands is refined in California.

CHEMICALS.—Although the West produces only about 10 per cent of the national output of chemicals, it supplies 90 per cent of the world's needs for borax, and more than its share of potash, salt cake, magnesia, wood pulp for processing to rayon, petro-chemicals and the fissionable materials.

Western production of sulphuric acid, chloride, caustic and soda ash is about balanced with the area's present requirements, and can be expanded as demand for these products increases. Basic fertilizer chemicals are an important factor in Western production, and an interesting development is the use of sulphuric acid for dissolving alkalis out of soils hitherto unusable.

The Western paint and varnish industry supplies about the entire requirements of the Western market for its products.

At the Basic Magnesium plant near Las Vegas, Nevada, the nubbin of a vast electro-chemical production center exists, if electric power from Boulder Dam can be had cheap enough. The State of Nevada has taken a lease on this from the government, in hopes of the future.

Capital

Financial and managerial controls will undergo a shift Westward in the next few years, in the opinion of Carrol M. Shanks, president of Prudential Life Insurance Company. He predicts that others will follow Prudential's lead in setting up regional Western autonomous home offices, and that the heads of many of the largest manufacturing and financial institutions will live in the West and direct the operations from here. As an example of Western growth attracting capital, he reports that his company is investing \$15,000,000 to \$16,000,000 a month in the region.

Manufacturing Philosophy

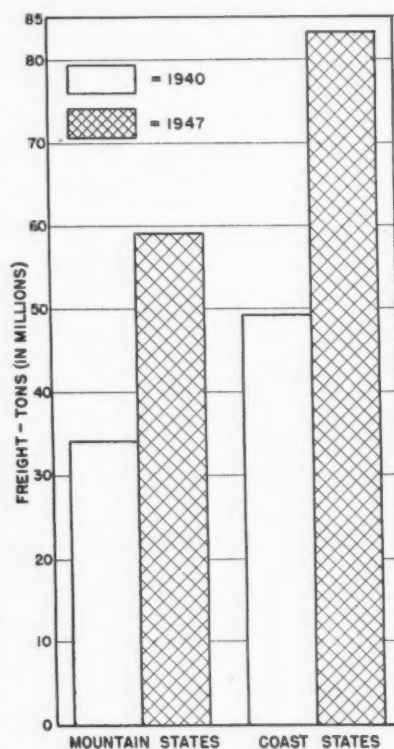
This is still relatively undeveloped in the West. Fruit and vegetable processors in the West are far ahead of their competitors elsewhere in the country in their understanding and application of mass production, and the Western lumber and oil refining industries are at least equal with their contemporaries, but in general manufacturing the West is still mostly a jobbing shop area.

Nevertheless, aircraft and aircraft parts production in wartime taught some Western industrialists a few of the lessons, and the Ford Motor Company's careful effort to develop suppliers of automobile parts is making its influence felt in converting job shop operators to the idea of production. The lag behind the east and Middle West is due in great measure to lack of the volume which would justify production operations.

Management "Know How"

The West's industrial management structure is lacking in the third and fourth generation personnel available in so many Atlantic Seaboard factories, nor has it yet utilized as large a proportion of technically trained men as are to be found in the east and Middle West. Nevertheless, the native ingenuity and resourcefulness of the first generation operator who has had to learn

INCREASE IN CARLOADINGS IN THE ELEVEN WESTERN STATES



the hard way has produced highly successful results.

Western management is often credited with more receptiveness to new ideas, but the criticism is also heard that the heads of Western companies are penalizing their own operations by failure to pay middle management enough to attract much-needed talent from other areas, and by lack of understanding of organizational structure.

Research

This factor is still undeveloped as compared with the east, but its value is rapidly being realized and the next decade is expected to witness much progress.

Labor Skills

As the West has been overwhelmingly an agricultural area until very recent years, it has not developed generations of trained machinists and other skilled workers. Expansion of the West has produced an unusual demand for a new crop of skilled manpower to keep industry running, but the West seems to be further along the road toward meeting its future labor supply problem than the rest of the country. While the West's population is only 10

per cent of the national total, its 45,000 apprentices acquiring skills in more than 200 different trades and occupations under training programs jointly sponsored by labor and management represent more than 25 per cent of the nation's total apprentices. Western labor, moreover, has been found to be highly teachable and intelligent.

Markets and Transportation

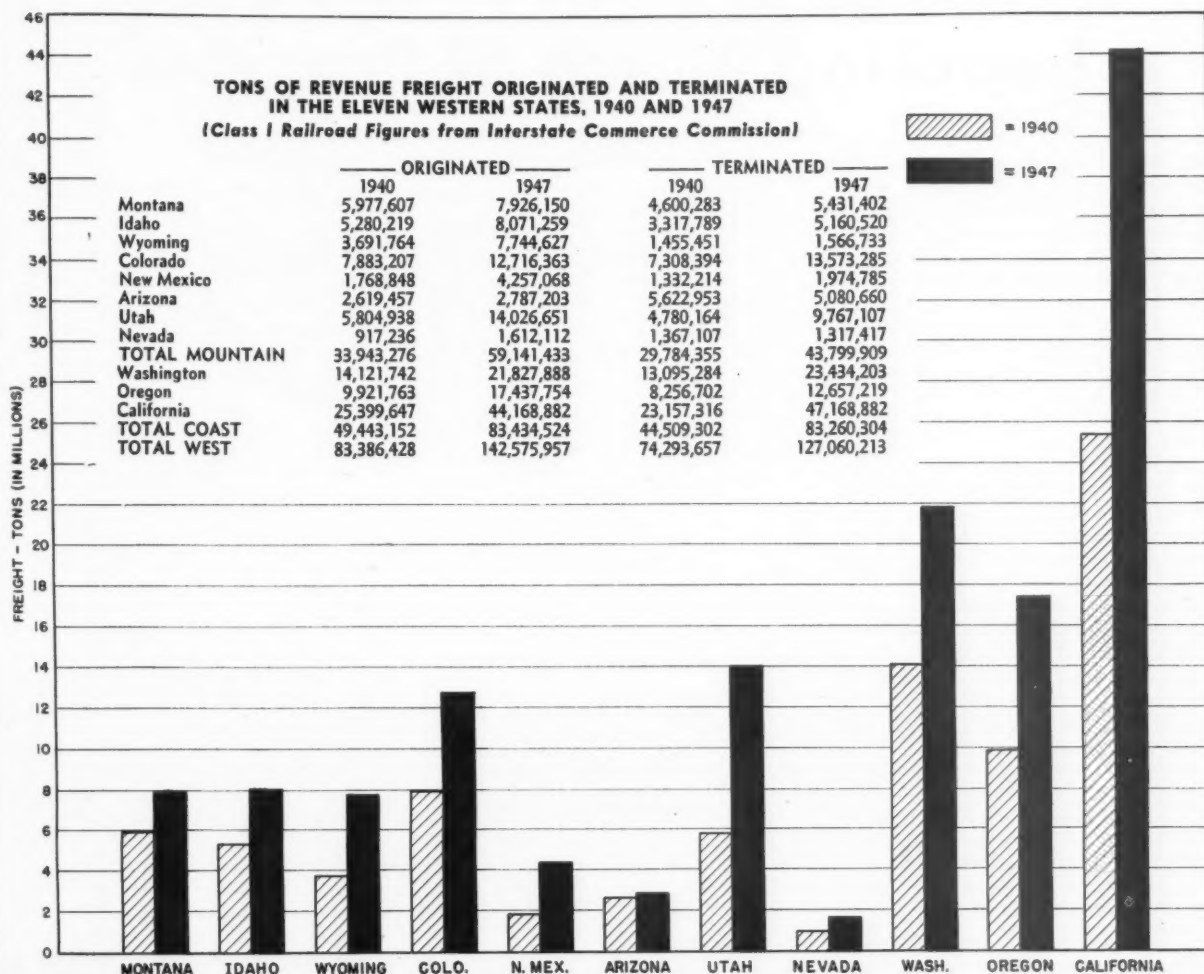
These two factors are so closely related as to be treated under one heading. As the West always has produced nearly all of the nation's copper, and much of its zinc and lead, markets for these products are nationwide. Its citrus fruits and apples and some of its processed vegetables also are distributed nationally, while its lumber and processed fruits have in the past supplied international markets.

Its manufactured products have seldom gone outside the West until shortly before the war, when some manufacturers attained national distribution. But the prospects for future national distribution for commodities where freight is an important factor seem rather dark at present, on account of the most recent freight rate increases and the adoption of mill basing

by the steel and cement industries. These freight penalties make it increasingly difficult to reach distant markets, particularly in view of the fact that increasing costs of intercoastal steamship operation have nearly put this form of transportation out of the running.

For example, the proposed railroad freight rate increases now pending before the ICC which would bring them 77.5% above the 1946 level would mean that freight would represent the following percentages of delivered costs of California canned foods: apricots and cling peaches, 15%; spinach, 24%; tomatoes, 21%; tomato juice, 24%. The largest canning companies are now engaged in buying canning factories in the east and midwest, but the smaller operators unable to perform that feat face the prospect of being confined to Western markets alone.

On the other hand, many industries faced with similar difficult barriers have been able to cut their costs in other ways sufficiently to make up for the freight. Furthermore, the population growth of the West now makes it possible for the area to sustain a far greater number of manufacturers who serve the West alone.





• Alkylation unit at Union Oil's Los Angeles refinery for separating alkylate gasoline from butanes and other by-products.



• Slag floating on top of a 90-ton ladle of molten steel flows into pots at Columbia Steel Company's Pittsburg, Calif., plant.

Developments of 1948 Reveal Imposing March of Progress

STEADY march of the eleven Western states industrywise continued throughout 1948 as hundreds of new and expanded developments were recorded, ranging from match blocks to steel, and representing hundreds of new millions invested in plants and tools to keep pace with the growing Western empire.

Vast power, irrigation and flood-control programs, topped by the announcement of the Army engineers for their proposed \$3,000,000,000 Columbia River control plan, were included in plans for Western development.

The Interior Department in Washington, D. C., also revealed plans late in 1948 for a proposed \$4,000,000,000 reclamation program extending into 17 Western states and covering the fiscal years 1948 to 1954.

Telephone, gas and electric and railroad and other transportation services were greatly expanded in multimillion dollar programs to meet the new population demands.

California with 53,992 dwelling units led the national procession in home building in urban areas for the first six months of 1948; Texas had 30,764 units; New York, 21,584, and Florida, 13,437.

One of the significant moves Westward was the opening by the Prudential Insurance Company of America of a new Western Home Office in Prudential Square on Wilshire's Miracle Mile, Los Angeles. Carrol M. Shanks, president, declared his

belief that "development of the Western region in the next few decades is going to be spectacular." In another, Nestle's moved from New York to Colorado.

Some of the major Western industrial developments planned, announced, completed or under way, for which approximate investment figures were available, included:

Columbia Steel Company opened a \$25,000,000 cold reduction sheet and tin plate mill at Pittsburg, Calif., as part of the program of United States Steel, parent company, involving \$130,000,000 of expenditures in the West since V-J Day.

Columbia also acquired the Aluminum Corporation of America plant near Torrance, Calif., from War Assets Administration for \$4,181,000, and planned an approximate \$30,000,000 investment to

convert it into a cold rolled sheet steel manufacturing plant.

The Geneva Steel Company, a Utah subsidiary of U. S. Steel Corp., began expanding plant facilities from plates alone to handle also the manufacture of light gauge flat rolled steel in hot rolled coils, as part of an \$18,600,000 conversion pledged by U. S. Steel in purchasing the plant from the government.

Henry J. Kaiser announced plans for a \$17,000,000 second blast furnace and related facilities at Fontana, Calif., necessitated by the contract with Transcontinental Gas Pipe Line Company to purchase approximately \$60,000,000 of steel plate for the Texas-New York natural gas pipeline.

Henry J. Kaiser's Eagle Mountain iron mine, near Indio, Calif., and railroad, representing an investment placed unofficially at \$7,000,000, were opened.

Kaiser Company received permission from Reconstruction Finance Corporation to expand the Fontana steel plant at a cost of \$3,000,000.

Henry J. Kaiser interests also purchased the iron blast furnace and coke plant at Ironton, Utah, from WAA for \$1,150,000. Kaiser-Frazer Corporation informed WAA it would spend about \$2,000,000 in reconvertng the plant.

Henry J. Kaiser's \$7,000,000 pipe mill, Fontana, Calif., began operations.

Bethlehem Pacific Coast Steel Corporation was completing a new electric furnace

WESTWARD MARCH IN REVIEW

This article is based on a review of Western Industry's popular monthly features, "The West on its Way" and "Regional Reviews," which highlight Western developments as they are reported. Some of the projects here listed may have been announced in another year and completed in 1948; some were announced in 1948 for completion during the year or in later years, and in some instances plans may have been altered since the original announcement was made. Space permits only a partial listing of some of the major projects.

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ant.

• Boeing Stratocruisers are shown under construction at the Seattle, Washington, plant of the Boeing Airplane Company.

• Workmen lower a 1949 model Lincoln town sedan onto the chassis at the Lincoln-Mercury assembly plant in Los Angeles.

at Vernon, Calif., as the latest step in a \$14,000,000 program to double the local annual output. Bethlehem also completed a \$500,000 bolt and nut plant at Seattle.

Colorado Fuel & Iron Corporation had under construction a new rod mill at Pueblo, Colo., as part of a \$9,000,000 expansion; Gilmore Steel & Supply Co., San Francisco, acquired Oregon Steel Mills, Portland, for a figure understood to be nearly \$3,000,000; Joseph T. Ryerson & Son, Chicago, completed construction of new steel service plants in Emeryville and Los Angeles, Calif.

Other developments:

Pacific States Cast Iron Pipe Co., Provo, Utah, \$2,500,000 foundry expansion.

Structural Steel and Forge Co., \$1,000,000 steel pipe plant, Salt Lake City.

United Concrete Pipe Corp., \$1,000,000 manufacturing plant, Stockton, Calif.

Taylor Pipe and Forge, Chicago, seven-figure investment, Fontana, Calif.

Schaible Co., Cincinnati, acquired plumbing fixture division, General Tire & Rubber Co., Pasadena, including \$1,000,000 building.

Standard Oil Company of California announced a \$7,500,000 expansion of the Bakersfield, Calif., refinery; a \$5,000,000 North Salt Lake refinery, as terminus of a \$5,000,000 pipeline Standard planned from Rangely oil field, western Colorado; and successful development of a Kettleman Hills Middle Dome well, \$1,000,000.

Continental Oil Refining Company began construction of an \$8,500,000 refinery near Billings, Mont.; Shell Oil Company announced a \$3,000,000 expansion of Northwest facilities; Utah Oil Refining Company began work on a \$2,500,000 propane deasphalting plant, Salt Lake City, and Southern Union Gas Co., Dallas,

Texas, selected Farmington, N. M., as the site of a \$1,000,000 gasoline plant.

California Company, Texas Company and Stanolind Oil & Gas Company planned a \$3,000,000 plant at Rangely for manufacturing gasoline from natural gas; and General Petroleum Company planned a \$2,000,000 gasoline recovery and repressuring plant in Washakie County, Wyo.

Four major developments in the lumber industry were reported in the Redding, Calif., area involving approximately \$14,000,000.

Ralph L. Smith Lumber Co., Kansas City, purchased Deschutes Lumber Co., Anderson, Calif., and 49,290 acres of timberlands; also option on cutting rights on 15,387 additional acres; total investment with expansions, \$10,000,000; U. S. Plywood Corporation and Harbor Plywood Corporation planned \$2,000,000 plywood factory; Oakwood Products, Inc., subsidiary of Deal-Ryte Products Corp., Los Angeles, will operate new \$1,500,000 flooring plant, Millville, Calif., and Hat Creek Lumber Company announces large remanufacturing plant planned for Shasta Dam area by five lumber companies.

Long - Bell Lumber Co., Longview, Wash., purchased two sawmills and extensive timber holdings of Gardiner Lumber Co., Gardiner, Ore., for more than \$5,000,000, and made other acquisitions.

Production was expected to start in 1949 at the \$6,500,000 sawmill and sulphate plant of Weyerhaeuser Timber Co., Springfield, Ore. Weyerhaeuser acquired Ewauna Box Co., Klamath Falls, Ore., in reported \$1,000,000 deal, and also other holdings during year.

Palanan Bay Lumber Company incorporated in Washington for \$5,000,000 to process Philippine hardwoods; Western United Lumber Manufacturers, Inc., Sac-

ramento, announced \$1,000,000 remanufacturing plant, and Pope & Talbot's \$1,000,000 Oakridge, Ore., sawmill was completed, in some of the other major undertakings.

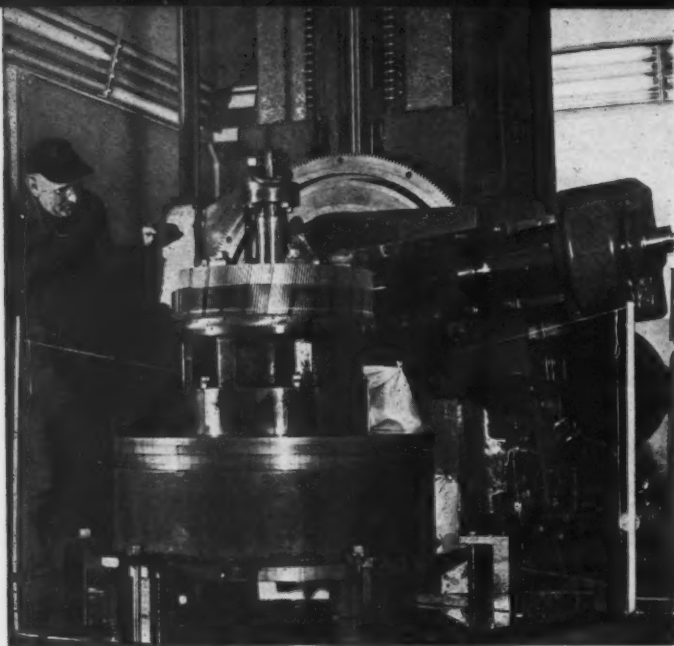
Weyerhaeuser Timber Company sold the two plants of Washington Veneer Co., Olympia, Wash., and firm's 60 per cent interest in Springfield Plywood Corp., Springfield, Ore., to Georgia Hardwood Lumber Co., Augusta, Ga., in \$4,500,000 deal.

Other large developments announced included M and M Wood Working Company of Oregon, \$1,500,000 plywood plant, Eureka, Calif.; Southern Oregon Plywood, Inc., Grants Pass, Ore., \$1,000,000 plywood plant; Portland Plywood Corporation new Portland, Ore., mill, \$900,000, and Menasha-Coos Head Plywood Corporation, \$2,000,000 North Bend plant.

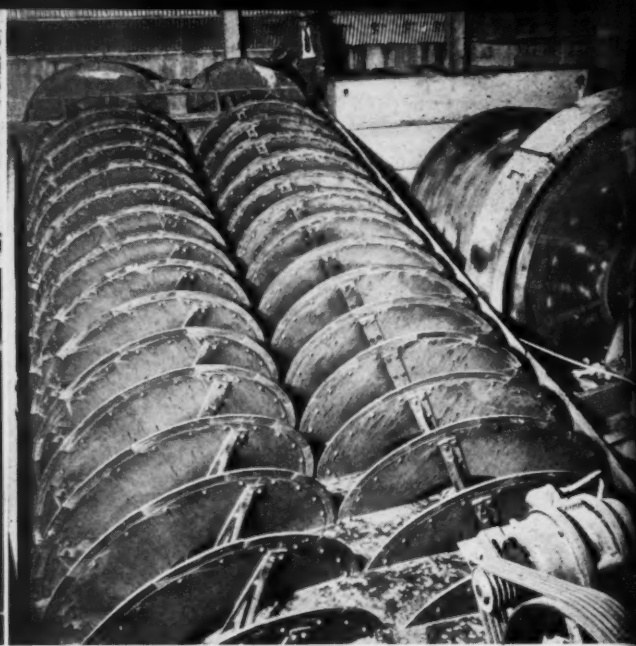
Fibreboard Products, Inc., constructed kraft pulp and paper mill, Antioch, Calif., plant and timber, \$18,000,000 investment; Rayonier, Inc., producer of wood pulp for manufacture of rayon and plastics, completed negotiations for purchase of Polson Logging Company timberlands and logging facilities, Olympic Peninsula, Wash., purchase price estimated at \$15,000,000; St. Regis Paper Company was constructing a \$900,000 plant for kraft paper mill, and planned a \$1,400,000 multi-wall bag plant, exclusive of machinery, Tacoma, Wash.

Kennecott Copper Corp.'s Utah Copper Division was to begin operations of new \$12,000,000 power plant near Magna Mill, Utah; Kennecott announced plans to build refinery near Garfield, Utah; firm also spent \$4,700,000 for new rail line and locomotives.

Anaconda Copper Mining Company was



• Hobbing machine at Sunnyvale, Calif., plant of Westinghouse. The big plant turns out a wide variety of electrical equipment.



• Classifier separating ore at Climax Molybdenum Company's big plant in Colorado. Mining is one of West's oldest industries.

rushing work on a \$20,000,000 Butte, Mont., project to unearth low-grade ores; Anaconda also expanded its sulphuric acid plant and other facilities.

Phelps Dodge Corporation will construct \$5,000,000 copper smelter at New Cornelia branch, Ajo, Ariz.

Bradley Mining Co., San Francisco, announced smelter at Stibnite, Idaho, for reduction of antimony and gold concentrates to cost approximately \$1,000,000.

Central Eureka Mining Company scheduled reopening of gold milling operations at Sutter Creek, Calif., after rehabilitation program costing about \$1,000,000.

Westinghouse Electric Corporation announced plans to purchase The Joshua Hendy Iron Works, Sunnyvale, Calif., for reported price of \$3,472,151; General Electric opened \$3,000,000 motor plant at San Jose, California; Willard Storage Battery Company opened \$1,000,000 Portland, Ore., plant. National Electric Products Corporation of Ambridge, Pa., purchased the Joshua Hendy Iron Works at Torrance, Calif.

Other developments:

Jacuzzi Brothers, Inc., \$2,500,000 pump manufacturing plant, Richmond, Calif.; L. A. Young Spring & Wire Co., \$1,300,000 Oakland, Calif., building; Atlas Imperial Diesel Engine Co., \$1,000,000 Hayward plant, to produce glass containers; General Metals Corp., Los Angeles, \$1,000,000 addition; Republic Supply Company of California, \$1,000,000 Los Angeles plant; Friden Calculating Machine Co., Inc., San Leandro, Calif., \$1,000,000 expansion; Gates Rubber Co., \$1,000,000 Denver, Colo., plant.

Western Crown Cork & Seal Corporation of San Francisco opened a huge new Bayshore plant; the Amino products plant of International Minerals & Chemical

Corp., San Jose, Calif., was opened; the structural steel work on the Owens-Corning Fiberglas Corporation's new Santa Clara, Calif., plant neared completion; General Mills' new flour mill for the Sperry Division, Los Angeles, was nearly completed; Aluminum Corporation of America planned a new West Coast plant near Vancouver; Morris P. Kirk, Inc., planned construction of a lead alloy plant in Portland.

In the food industry, Nestle Company, Inc., announced plans to remove executive offices from New York to Colorado Springs, Colo., where a \$1,000,000 office building is to be constructed; Hunt Foods, Inc., announced Hayward, Calif., warehouse as first step in \$2,750,000 expansion; Best Foods, Inc., announced two San Francisco factory buildings to cost \$1,250,000. Barron-Gray Packing Co., San Jose, Calif., and Hawaiian Pineapple Company, Hawaii, consolidated in deal reportedly involving \$3,000,000.

Other developments announced under way or completed:

Welch Grape Juice Company, \$1,000,000 plant, Wenatchee, Wash.

Pabst Brewing Co., Milwaukee, purchased Los Angeles Brewing Company; \$4,500,000 expansion planned.

National Biscuit Co., \$6,000,000 bakery, Portland, Ore.

Holly Sugar Corp., \$5,000,000 Brawley, Calif., refinery; California-Hawaiian Sugar Refining Corp., \$3,000,000 expansions; Utah-Idaho Sugar Co., new \$1,000,000 beet pulp drying plant, Chinook, Mont.

Del Mar Canning Co., Warrenton, Ore., \$1,000,000 plant.

Denver Union Stockyards Co., \$500,000 improvements.

U. S. Gypsum Company and Western

Gypsum Company, three to four millions for new plants, Sigurd, Utah.

Ideal Cement Company's \$6,000,000 cement plant, Portland, Colo.; Lehigh Portland Cement Co., \$1,000,000 expansion, Metaline Falls, Wash.

Flintkote Company's new \$1,000,000 Portland, Ore., roofing factory; Paraffine Companies, Inc., asbestos-cement building materials plant, Redwood City, Calif.

American Potash & Chemical Corp., Searles Lake, Calif., \$300,000 research laboratory; \$4,500,000 soda ash-borax plant and \$2,000,000 power plant expansion.

Dow Chemical Co., Pittsburg, Calif., \$3,500,000 expansions.

Panhandle Carbon Company buys carbon black plant, Eunice, N. M., from WAA for \$1,600,000.

International Minerals & Chemical Corp., \$1,000,000 refinery, Carlsbad, New Mexico.

Shell Chemical Corp., \$5,000,000 California expansions; Hancock Chemical Co., Long Beach, \$2,000,000 plant; Monsanto Chemical Co., Seattle, new \$1,000,000 plant; \$4,000,000 expansions planned; Westvaco Chemical Co., \$4,000,000 electric furnace, Pocatello, Idaho.

Boeing Airplane Co., Seattle, Air Force stratofreighters, \$20,000,000; Lockheed Aircraft Corp., Los Angeles, \$5,000,000 Navy jet fighters; Northrop Aircraft, Inc., Los Angeles, \$5,500,000 assault transports; also \$1,500,000 contract from Boeing for B-50 landing flaps; Solar, San Diego, another \$3,000,000 for jet engine components; Ryan Aeronautical Co., San Diego, \$2,500,000 for Army Field forces and National Guard; Consolidated Vultee Aircraft Corp., San Diego, \$5,000,000 subcontract for Boeing nose fuselage section.

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—Courtesy Michelson Naval Ordnance Laboratory, Inyokern, California.

• "Man's productivity is no longer measured by the hours he works, but by the capacity and efficiency of the machine he operates."

Tooling Requirements of the West's New Production Era

By WALTER KASSEBOHM
Moore Machinery Co., San Francisco

AT NO time during the last hundred years, which can truly be designated as the "industrial revolution," has industry been confronted with so many powerful forces for change as in the last few years.

In these last few years we have had World War II with its enormous pressure for large quantity production, some of it connected with high production. We also have had and still have the labor problem which could be designated as the "social revolution" with the desire for greater reward for less effort.

It is part of the American life to cause and maintain prosperity by producing more, better and cheaper things, and in

addition to it promote more leisure time to enjoy these things.

This kind of philosophy can only be transferred into reality by applying modern engineering and human relation knowledge to productivity.

To achieve highest production output and efficiency, much more is required than willingness: Sound knowledge of methods, modern processes and modern tools are a requisite.

The last Machine Tool Show in September, 1947, in Chicago expressed very clearly that "a man's productivity is no longer

measured by the hours he works—but by the capacity and efficiency of the machine he operates."

These remarks are fundamental and true for the whole of the United States, may it concern production in New England or in California. The West, however, has its peculiar additional problems which make the road to our industrial maturity and success a more difficult one and yet, from the engineering standpoint, a more challenging and interesting one.

What are these problems?

1. Additional cost burden has to be carried by manufacturers on the West Coast which produce for national distribution due to freight differentials.

2. In general, wage rates are higher on the West Coast, in particular for lesser skilled labor. This means additional manufacturing costs, in particular on items produced with semi and unskilled help.

A partial indication of higher wages and income in the West, in broad and over-all terms, is the comparison of the per capita income for 1946:

Average for United States.....\$1,200
Average New England States..... 1,300
(For high skilled industrial labor)
Average for California..... 1,531

What happened to the California manufacturing industry in the last fifty years? In spite of high labor cost a tremendous industrial growth must be noted.

Output in Dollar Volume

Expressed in dollar volume for all durable and non-durable goods produced the total approximate output is as follows:

1904	1939	1946
343 million	2,798 million	7,443 million

California's industrial growth is certainly sensational but was helped by war conditions and after the war by the unbalanced condition of supply and demand.

The big question is: "Can California keep its industrial might?" Can the Western and, in particular, the California industry maintain its newly attained high productivity? Can it even grow further, in particular when the pipe lines of supply are again filled, causing strong competitive times?

There is one fundamental truth important to all industrial activities. Management must strive to get higher production output with lesser cost per unit. This is particularly important for California's industry due to the higher wage rates.

What can be done? Besides an efficient general business affairs and sales set up as well as good human relations throughout the plant, there is the important question of *modern product engineering design* and the equally, if not more important question of *modern machine tool usage* with a modern, up to date *general tooling set up*, all of which dovetail into each other and have to be satisfactorily answered.

Product Engineering Design:

The design should not only have functional considerations but also must be designed for ease and speed of manufacturing.

Punch press work, for instance, of late has come very much into the foreground. Last year, for example, \$100,000,000 worth of punch presses were made and shipped, in our country.

There is another indication showing the preference for stampings, namely:

Output of steel in 1946 averaged 26 per cent increase over 1940.

Output of sheet and strips in 1946 averaged 47 per cent increase over 1940. (Customers would take a lot more sheet and strips if they only could get them.)

Reasons for more stampings:

It cuts cost, saves labor and increases output.

Samples of this:

(a) **Automobile Manufacturing**—In early designs radiator grills were made from stampings. When designs became more complicated, they were made from die castings. Today there is again a trend to have them made from stampings because of more knowledge in the field of making stamping dies, in advances of metallurgy and because of lower costs.

(b) **Pipe Fittings**—"Tees" and "Ells" as well as "Couplings" were made from cast iron or malleable iron for many years. Today they are made from stampings from sheet steel with 75 per cent cut of labor cost.

(c) **Bathtubs**—They weigh 350 pounds in cast iron. They weigh 125 pounds when made from stamping, which cuts freight cost and makes installation easier. Twenty-five per cent of all bathtubs are now made from stampings. Also sinks, toilets, kitchen cabinets, stoves, etc., which formerly were made from cast iron, are now in larger and larger amounts made from stampings.

The art of stamping advanced at least 25 years in the five wartime years.

Examples:

(a) Crosley Automobile Engine:

Four-cylinder engine block; assembly consists of 125 parts. Weighs 14.8 pounds before machining. Only 1.2 pounds metal is removed in light cuts and honing. Spot-welded and copper-braced. Cylinder and tubes are chrome-molybdenum tubing which air-hardens after copper-bracing.

(b) Trigger Housing for 30 Calibre Carbine:

Forged—Cost \$5.00 each.

Cast—Cost \$4.00 each.

Stamped—Cost \$2.50 each.

(c) Cost of Pyrotechnic Pistol

Cost—\$34.00 each.

When redesigned and made from stampings—Cost \$11.00 each.

These examples show quite clearly the contribution which good product design in connection with sheet metal stampings can make to reduce the manufacturing cost.

Now, let us look at the part which "tooling" or better expressed by the over-all description of "tool engineering" can, and in fact, must play in today's effort to cut manufacturing costs.

Tool engineering of today is gradually moving away from being an art and is fast becoming more and more an exact engineering science. It concerns itself with an endless amount of problems, ranging from accurate knowledge of machine tool design and operation, efficient design of jigs, fixtures, dies and molds, the correct design and application of cutting tools, grinding wheels, lapping methods, honing, polishing, plating, the knowledge of coolants, lubricants, feeds and speeds, metallurgy to the knowledge of tolerances, gages, inspection and numerous other problems, in particular in the metal manufacturing industry.

The importance of tool engineering can best be described by citing a few examples of manufacturing and showing the amount

of independent machining operations which are required to produce a complete product. When considering that each of the machining operations is a tool engineering problem of its own, sometimes requiring elaborate jigs, fixtures, dies, special machinery and gages, the importance of today's tool engineering can best be recognized.

Rotary Aircraft Engine: Requires about 45,000 independent machining operations.

Parts for a 50-Calibre Machine Gun: Requires about 3,500 independent machining operations.

75 Millimeter Shell and Fuse: Requires about 100 independent machining operations.

Gradually the manufacturing industry is recognizing tool engineering as a profession and it is recognized that America's supremacy in mass production has to a large extent been the work and achievement of tool engineers.

A manufacturing organization which does not recognize this fact is bound to be overshadowed by sharp competition of plants which have a sound tool engineering set up.

This is now known by those who are responsible for the education of our future engineers and some universities have now accepted into their engineering curriculum the education of certain aspects in "production engineering" and "tool engineering."

Must Have Its Place

In the interest of self preservation and future growth the West Coast's educational institutions, as well as the manufacturing industries must realize that tool engineering is well recognized and accepted throughout the eastern and middle-western industries and must have its place in Western manufacturing.

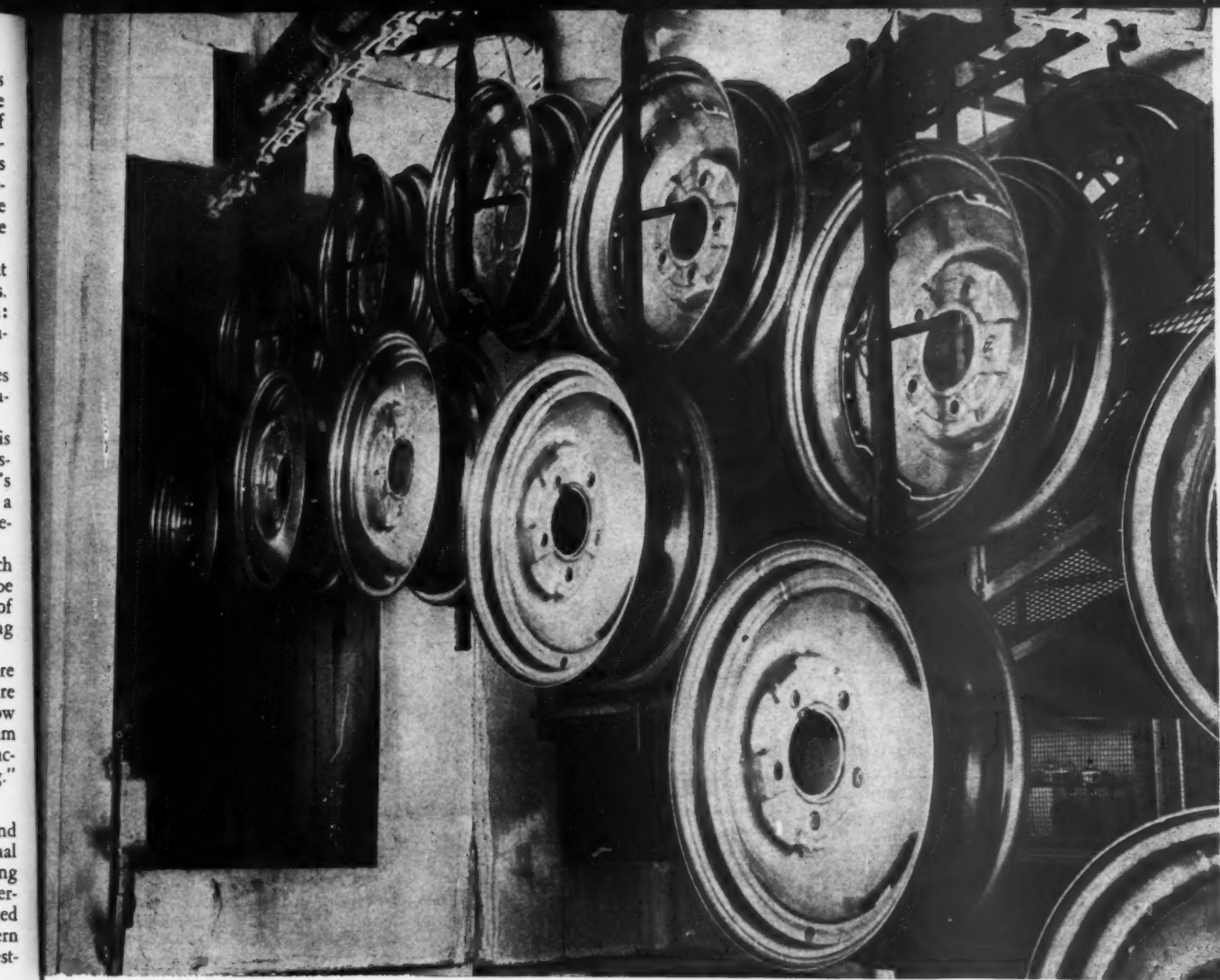
It must be realized that tool engineering not only applies when manufacturing in large quantities, but it is of no less value in small quantity production, as well as in jobbing shop work.

The application of tool engineering is only a matter of degree. Tools must be built in the correct relationship to the production job to be done.

Great strides have been made in the development and design of tools for temporary use, or so-called small production runs. Standard shaped clamps for jigs and fixtures are on the market and their use helps greatly to reduce the cost of building of this kind of tool. Welded construction has made great advances and is used extensively for temporary tools.

Metal sawing with band saws and to precision dimensions has made great strides and is now used to a large extent in the making of die blocks and punches for cheaper class dies.

Rubber dies, Kirksite dies and similar new developments in form and drawing die construction have been developed in particular during the last war period to a high degree of efficiency combined with cheapness of construction.



• Automobile wheel line at Norris Stamping & Manufacturing Co., Los Angeles, is an outstanding example of good tooling in the West.

The range and versatility of standard machine tools is constantly being increased to make them suitable for competitive low production runs. In many instances attachments are also provided for standard machine tools to increase their flexibility and to reduce set up times for short run jobs.

When designing for a really high production output there are no technical limitations to the possibilities. The use of "special machinery" is the acme of high production tooling. The relation of tool costs, however, versus the value as well as a quality and quantity of parts produced must always be the first consideration. This is of as much importance for low output production with temporary tools as it is for high production with most modern precision tooling and special machinery.

Let us now consider the hard and practical side of the tooling problems with which our Western manufacturing plants are confronted today. What can the plant manager do to keep, or get up to date and meet coming stiff competition with more output at lesser cost?

(1) Encourage study of tool engineering by product designers, foremen, tool designers and toolmakers. If at all possible give classes in tool design and toolmaking to establish uniform tool practices throughout the plant.

(2) Establish sound and responsible tool engineering in the plant so a disposition of questions concerning tools can be made efficiently, accurately and with authority.

(3) Encourage key manufacturing personnel to keep up to date with modern developments in machine tools, production equipment, tooling, new developments, such as powdered metals, precision (investment) castings, die casting, permanent mold casting, modern cutting tools, such as negative rake angle cutters, modern die design and anything in connection with tool engineering.

(4) Master the economics of tool engineering so as to be able to prove *cost-wise* to the top management the advisability of investment in modern tooling.

(5) Read trade papers and magazines

and visit tool and metal shows for stimulation.

Business developments during the last few years on the West Coast have assured that there exists a new era of industrial progress side by side with the agricultural accomplishments.

The enormous population growth has opened new markets which are also constantly being improved with neighbors of the vast Pacific. The prevailing pioneer spirit of the West Coast with its desires for more and better things, has contributed largely to the growth of many industrial enterprises. The West Coast is saturated with a new progressive spirit and is not hampered by tradition as much as other sections of our country.

This spirit is embracing a new relationship of cooperation and understanding of human nature and people, as well as the knowledge that only the highest technical developments and most modern machinery must be applied to manufacturing of products to get the best quality and the largest quantity at the lowest cost. This is true progress towards the new Atomic Age.

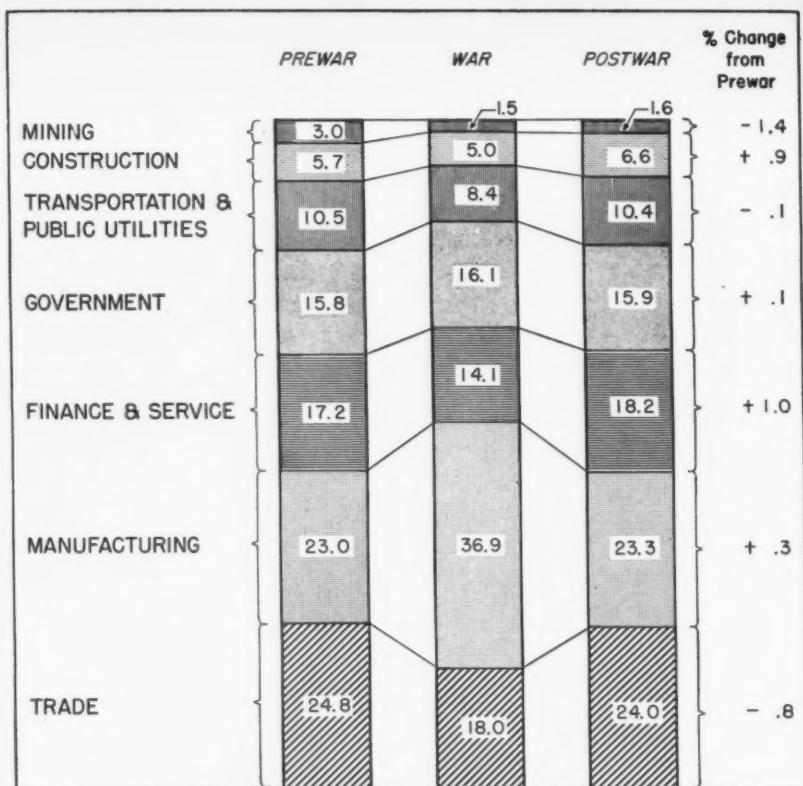
Expansion Greater But Similar To Prewar Pattern

GREATER industrialization exists in California, Washington, Utah, Nevada and Arizona than before the war, although the division of employment between the various occupations constitutes much the same pattern that existed in 1939, according to an employment study by the research department of the 12th Federal Reserve Bank in San Francisco.

"The industries that have increased in relative importance are for the most part those which require a larger than average amount of capital per employee and per unit of output," the bank reports. "As a result, the District may be considered more industrialized than before the war, even though manufacturing's share of total employment has not changed.

"The effect of the war period has been to hasten the broadening of the industrial base of Twelfth District economic activity. Steel capacity and output have more than tripled. A substantial portion of the aluminum production of the entire country is centered in the Pacific Northwest. Aircraft activity is now many times greater than prewar, and aircraft production capacity (and also shipbuilding capacity) far exceeds production levels and would permit considerable expansion. The making of many different kinds of machinery, ranging from road-building equipment to small electric generators has also expanded considerably since 1939.

"As a consequence the District is now somewhat less dependent on outside sources for industrial products than it was a decade ago. Substantial quantities of steel, machinery, manufactured parts and sub-assemblies, and other industrial goods, however, are still purchased from other parts of the country."



• Percentage distribution of employment in five Western states for 1939, 1943, 1948.

"Increased industrial development is at first marked by an expansion of other consumer goods industries for local consumption as had been the case in prewar years in both states," the bank reports. "A further stage in the development occurs when additional heavy industry is introduced to take advantage of previously unexploited resources, locational advantages, or increasing demand for such goods. This stage is evident in California and to a lesser extent in Washington. California, however, is entering the next phase in which more highly processed goods are also produced."

Distribution of workers in non-agricultural occupations in these five states is not markedly different than before the war, the Federal Reserve Bank finds, despite the fact that employment is virtually as high as during the war and over 70 per cent higher than in 1939. Figures from Oregon on a comparable basis were not available, but in all probability the situation was the same there.

Employment is somewhat differently distributed among individual industries than in 1939, with the heavier industries tending to show a proportional gain over the rest, but little trace remains of the wartime pattern.

Studies made by the bank show employment of wage and salary workers about 1 1/2 per cent less than in 1943, but if proprietors of unincorporated businesses are included, employment is actually higher than

during the war, despite a loss of 650,000 jobs in shipyards and aircraft alone. Other manufacturing industries, such as lumber, stone, clay and glass, apparel, chemicals and petroleum, absorbed some of the shipyard and aircraft people, but there are 600,000 fewer people left in manufacturing employment than at the war peak and they constitute a smaller proportion of total non-agricultural employment. In 1943 they constituted more than a third of the total, while now they are less than one-fourth.

While the heavily swollen ranks of shipyard and aircraft labor forces have shrunk sharply since 1943, this has been offset by a gain of 250,000 people in trade, 170,000 in finance and services, approximately 80,000 in transportation and public utilities and about 70,000 in construction. These figures reflect the contraction of these occupations in wartime under the pressure of higher war work wage scales and controls on manpower.

The pronounced exception to the prewar pattern found by the bank is mining, where employment has decreased both in number and in relation to total employment. This is due to increased mining costs, while the price of gold is fixed by statute.

Construction has become more important than before the war because of the backlog of building needs and current demand, while expanded population and income has caused finance and services to gain. This in turn has tended to hold down

Percentage Distribution of Manufacturing Employment in California

	Prewar	War	Postwar
Food	31.7	13.1	20.5
Shipbuilding and aircraft*	7.6	51.5	14.1
Machinery	6.2	7.5	10.6
Iron and steel	8.5	6.0	8.9
Printing and publishing	7.4	2.6	6.3
Apparel and finished textiles	6.6	2.6	6.2
Lumber	6.4	2.4	5.6
Stone, clay, and glass	3.4	1.8	4.7
Petroleum and coal products	3.3	1.8	4.2

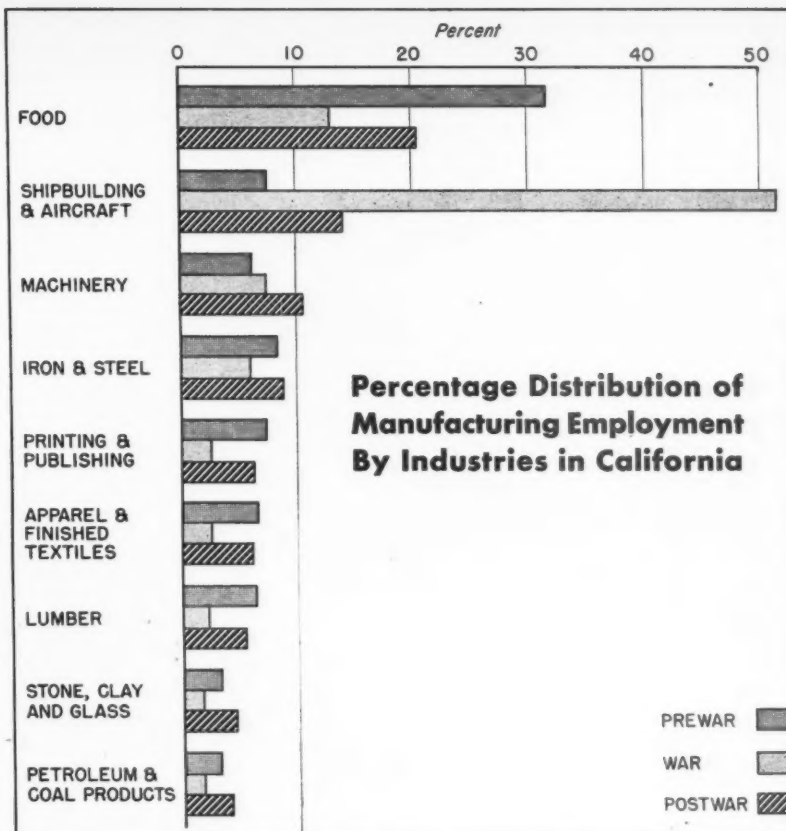
*During the war shipbuilding accounted for almost half the employment in this group, now is only slightly more than 10 per cent.

Prewar dates are for Oct. 1939, war for Aug. 1943, postwar for Aug. 1948.

Industries having less than 4 per cent of total manufacturing in Aug. 1948 omitted. Machinery employment includes electrical and non-electrical machinery.

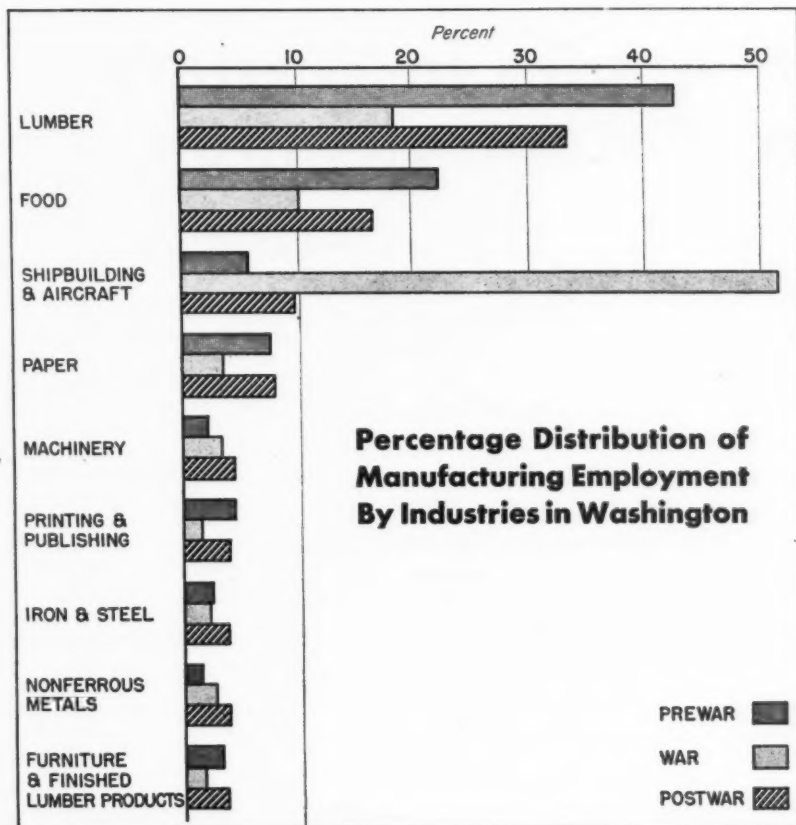
the proportion of workers in manufacturing. The bank also points out that a considerable portion of the increase in manufacturing production has been accounted for by a much larger scale of capital outlays than in the past.

Durable goods industries in general have had a larger percentage of gain than nondurable, and the conspicuous examples noted for California are aircraft, iron and steel, stone, clay and glass, and automobile assembly. Petroleum refineries also have had a relative increase, but the raw



material industries, such as lumber and food processing, and the consumer goods industries, such as apparel and furniture, constitute a smaller proportion of the total than before the war.

In the bank's study, California represented almost 80 per cent of the total manufacturing workers, with Washington having 18 per cent. In that state the pattern is similar to California, with lumber and food processing constituting a smaller proportion of the total than prewar, and significant gains in aluminum, iron and steel, aircraft and machinery.



Percentage Distribution of Manufacturing Employment in Washington

	Prewar	War	Postwar
Lumber	42.8	18.6	33.5
Food	22.4	10.2	16.7
Shipbuilding and aircraft*	5.8	51.6	9.7
Paper	7.8	3.7	8.1
Machinery	2.5	3.5	4.5
Printing and publishing	4.5	1.7	4.1
Iron and steel	2.6	2.3	3.8
Non-ferrous metals	1.5	2.7	3.8
Furniture and finished lumber products	3.3	1.7	3.6

*Though separate figures for shipbuilding and aircraft not available, shipbuilding probably not more than 10 per cent of the employment in this group at present, whereas in wartime it was probably 50 per cent or more.

Prewar data are for Oct. 1939, war for Aug. 1943, postwar for Aug. 1948.



• New packaged foods plant of General Mills' Sperry Division at Lodi, California, an example of plant decentralization in the West.

Significant Angles in Western Industrial Decentralization

By STUART P. WALSH
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San Francisco

HAS the West, particularly the Pacific Coast, passed its post-war peak of rapid industrial growth?

Is the movement of industry from congested cities to smaller communities—what we have called decentralization—losing some of its momentum?

What types of industry are seeking new locations in the West today, and what sort of sites have they in view?

These are three high-priced questions that can not be answered conclusively or simply, but there are some indications on which at least partial answers can be built.

Industrial expansion has been less rapid in 1948 than in 1947 or 1946 for the West as a whole, though the reverse has been true in certain spots, particularly in the Salt Lake area. Five principal reasons are cited by those who think the peak of post-war expansion has been passed:

1. Other areas, alarmed by the rapid growth in the West, have organized resistance movements. State and private business groups in the east are making strenuous efforts to hold their factories at home. The Deep South, the Gulf area, and the Mid-continent are all making strong bids for new industry, offering light taxes, low-cost labor, plentiful fuel and water, and cheap freight rates.

2. There seems to be a wide impression, however wrong it may be, that power and water in the West will be limiting factors for a long time; that we have just too many people out here for these resources to supply.

3. Some eastern firms, in their eagerness to serve expanding western markets, have been hard hit by the high break-even points of present-day operation, both in their new branches and in their home plants where the withdrawal of production for the West

has been felt. News of this has made other concerns hesitant about western expansion.

4. Equally serious and closely related to No. 3 has been the factor of continued high building costs, for which little relief is in sight. Many national concerns which leased or purchased western plant sites a year or two ago have let them stand vacant—though still hoping eventually to build.

5. The new yardsticks of national security and the allocation of defense contracts to mid-continent and gulf areas may somewhat limit the location and expansion of certain types of "essential" industries on the Pacific Coast.

To this list of retarding factors several others might be added, such as the prolonged impairment of Far Eastern trade, high freight rates, and the ban on "basing point" prices, though the long-range effect of these last two is not now clear.

Against these possibly adverse influences

there are great expansive forces in the West that seem likely to continue. The momentum of recent rapid population growth, together with the resulting political power, give the West a strong position in the national economy. And though it has been maturing fast in this decade, the West is still a young region with vast potentials for further development. The peak rate of post-war growth may have been passed, but a continuation of solid growth seems inevitable.

Will this growth continue to bring industrial plants to the smaller cities of the West? Is decentralization *within* as well as *to* the West still a major trend?

Part of the answer is plain to read in the pages of *Western Industry*. Of all the new plants and plant expansions listed in "The West On Its Way" columns in 1948, the great majority were in relatively small communities—many of them suburban towns, it is true, but not congested metropolitan centers—and this despite the fact that reports from the big cities are more complete than from the smaller places.

The urgings of the National Resources Security Board continue strongly on the side of decentralization, but an even stronger influence is the testimony of manufacturers who try small town life and like it.

Typical Experience Cited

Typical of their experience is the story of an office supply manufacturer who decided two years ago to locate a branch operation in a Willamette Valley town in Oregon instead of adding a wing to his large plant in Oakland. The company's market pattern did not call for a plant in Oregon; the choice was made largely because of the high caliber of workers available there and the low overhead costs.

The executives of this company have been so pleased with their small town experience that they have asked us to find them another branch location for their expanding operations.

"Our plant in Oregon has shown a profit since its first month of operation, which is something we didn't think possible," they told us. "We've had a wonderful welcome in the community. Our company counts for something there. We've cut the cost of supervision as well as overhead. We've got fine people working for us. Now we're ready to set up another deal like that somewhere else."

Can this company expect to duplicate its good fortune? Well, we've told them about another town, a pleasant little city, on a main railroad and highway in another state where there used to be a knitting mill before the war manpower shortage closed it out. There are good workers there who would like to use their aptitudes again. They are in a farming area 50 miles from a large city, and only 24 hours by truck from most major cities of the West.

Does it sound attractive? The company in question thinks it does, and we'll be sur-

prised if they pass it up. They might, however—for it is one of several places that would fit their needs almost equally well.

This movement of industry to small communities is going on throughout the country, and particularly in growing regions like the West. Twenty to 40 miles from a large city seems to be the most favored area, and nearly half of all the new plants reported in *Western Industry* last year were located within that range from Los Angeles. Communities more than 60 or 70 miles from fair-sized cities are not quite so much favored except for plants based on local raw materials, unless they are on main rail, highway, and air routes.

In addition to those industries that must locate close to their raw materials or near their largest markets, what kinds of industry are seeking new sites in the smaller towns?

Few Samples Listed

A list of even the major types would be too long to mention here, and the total runs into hundreds, many of them, of course, in the "light industry" class. The executive offices of Nestle's Chocolate have moved from New York to Colorado Springs; American Forge has bought a 12-acre site at Niles, California; Autoweld of Detroit has set up a branch at El Monte, California; Thermoid Rubber makes brake lining at Nephi, Utah; Conner & Co. will make truck bodies in Olympia, Washington; Moore Business Forms has a new plant in Salem, Oregon; John Hancock Life Insurance has moved its western region "paper work" from San Francisco to Monterey.

These are a few examples, from the record, that indicate the wide range of industries that are interested in decentralized locations.

What location requirements do most of these industries have in view? To bid for them successfully, a community must be in the "favorable" column of quite a long list of factors. Some of these, including transportation, utilities, tax rates, supplies, and markets, hold their usual importance, but others, such as labor, living conditions, plant sites, and buildings, have taken on new significance.

Critical Examination Made

Communities that have little or no "skilled labor"—meaning labor with factory experience—are no longer handicapped by that circumstance. Many companies today prefer localities where such labor is non-existent. They want men and women accustomed to farm or home work, who will quickly learn the skills that are required.

Living conditions and all that they imply—climate, recreation, schools, churches, and local government—are being more critically examined by industrialists today who are anxious to identify themselves with attractive progressive communities.

Climate as a factor in living conditions is less rigid a requirement than it used to be in the West, due in part to the spread of air conditioning, convenient transportation, and winter sports. When other major factors are anywhere near equal, industrialists will pick the town that seems to offer the most desirable living conditions, the town that makes them most welcome, not with free sites or other subsidies which few reputable concerns would accept, but with sincere assurance of good will and friendly cooperation.

A property owner who holds out for a price that is out of reason, an assessor who soaks a new industry with excessive taxes, or a planning commissioner who regards a factory as inevitably an eyesore, can ruin a community's chances for favorable consideration.

Plant sites must be much more spacious than they formerly were. There must be room to spread out in a one-story building, and there must be ample parking space for employees. In many cases, baseball lots and landscaped areas are considered essential.

A small or medium-sized concern today is often looking for a plant site in a residential area. The Gousha Map Company, which makes the road maps you get at gas stations, wanted such a site in San Jose, but home owners protested "spot zoning" the property for light industry. When they were shown the plans, however, they withdrew their protests, and the map company's plant is now the show place in a residential district long famous for its attractive homes and gardens.

New Designs Pleasing

Many new factories today look like well designed modern schools, and there is no reason why they should be segregated on some low ground where they will be "least objectionable"—as city planning commissions seem to think.

Another out-of-date idea is that in a segregated industrial zone any style or shape of structure should be permitted, because no one will see it anyway—no one, that is, except all those who work in that area or go past it on the railroad or highway. Modern design can create good looking factory buildings as cheaply as ugly ones, and the realization is growing that attractive industrial plants can be just as much a source of pride and an economic asset to a community as attractive dwellings.

Of all the factors that draw industry to the countryside, however, the most compelling is what may be called better human relations. That is the overwhelming testimony of plant managers and workers. Higher productivity, lower absenteeism and turnover, better union relations, higher morale—it may be any one or any combination of these—but it is in this field that the chief competitive advantages of decentralization are being demonstrated. The evidence seems to be growing, and it spells new opportunity for many smaller communities in the West.



Rolling aluminum sheet at Kaiser's Trentwood mill.

• Light metals production from zero to hundreds of millions of pounds in eight years is one of the West's big accomplishments.

Expansion Estimates to 1960 for Pacific Northwest Industries

By IVAN BLOCH

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IF ELECTRIC power consumption is an index of industrial activity, then the Pacific Northwest can expect a four to about six-fold expansion in major industrial enterprises by 1960. This is the indicated forecast contained in the "Review Report of the Columbia River Tributaries," the completion of which has just been announced by the U. S. Corps of Engineers.

This monumental report was authorized in a resolution of the U. S. Senate Commerce Committee in 1943, which requested the Corps of Engineers of the U. S. Department of the Army to prepare a review of its past plans for the comprehensive development of the Columbia River. The task was made the responsibility of the North Pacific Division, headquartered in Portland, Oregon, under the direction of Colonel Theron B. Weaver, Division Engineer.

In order to arrive at a rational appraisal of the needs for additional development of the Columbia, the Division Engineer secured the staff assistance of numerous other federal and state agencies. Each prepared exhaustive analyses of the physical, economic and technical aspects of the future growth of the region comprising the drainage of the Columbia: Oregon, Washington, Idaho, Western Montana, portions of Wyoming and of British Columbia.

Thus the Corps prepared for preliminary public hearing purposes a bold yet realistic plan of action for the construction of numerous river control works including seven main dams on the Columbia River and its tributaries for flood control, navigation, power, irrigation and other purposes. These major structures will provide a direly needed additional 6,000,000 kilowatts of generating capacity which would bring the total in the region to some 10,000,000 to 11,000,000 kilowatts by 1960.

The four appendices to the main report, on power markets and developments in the Pacific Northwest, represent the summary of over two years of continuous work by the former industrial staff of the U. S. Bonneville Power Administration, aided by selected staff members of the U. S. Forest Service and the U. S. Bureau of Agricultural Economics. The supporting reports, several inches thick, are encyclopaedic in the scope and detail of their analyses of raw materials, production costs, and markets of important industrial segments of the future economic pattern of

the Pacific Northwest. It is not likely that such an exhaustive study has ever been attempted and completed in any other area of the world.

To accomplish the task of appraising future industrial growth in the Pacific Northwest, the former staff of the Division of Industrial and Resources Development of the Bonneville Administration was divided into teams of economists, chemists and metallurgists to analyze each major industrial group: production processes and costs, producers and production statistics, markets (world, national West Coast and Pacific Northwest).

From these analyses, summary forecasts were then derived for plant capacities and power requirements. Upon completion of the analyses of each industrial group, and the condensation of bulky memoranda into summary reports, each report was submitted to an extensive number of industrial corporations throughout the United States for critical review. The final reports, as utilized by the Corps of Engineers embody the many practical suggestions of major industrial concerns.

Because of time and fund limitations, greatest attention was given to major power-consuming industries. These included:

Light metals industries: aluminum and magnesium.

^{1/} Until the end of 1947, the author was Chief of the Division of Industrial and Resources Development of the U. S. Bonneville Power Administration, and Special Consultant to Secretary of the Interior J. A. Krug on Western and Alaskan industrial development. It was under his direction that the staff of the Division of Industrial and Resources Development, during 1945-47 prepared the voluminous industrial appendices to the U. S. Corps of Engineers' "Review Report on Columbia River and Tributaries."

Ferrous metals and related industries: rolled steel and stainless steel; iron and steel castings; ferroalloys; electrolytic iron and manganese.

Nonferrous metals: zinc, lead, copper, and antimony.

Non-metallic industries: cement, artificial abrasives.

Electrochemical industries: phosphorus, phosphoric acid, phosphates and phosphate fertilizer; sulfuric acid; calcium carbides and derivatives, such as acetylene, acetic acid, acetic anhydride; chlorine, caustic soda, chlorates and perchlorates; carbon disulphide; rayon.

Forest and forest products industries.

Agriculture and food processing.

Many other industries, however, were not covered, such as for the production of rare earths and rare metals, and numerous electrochemicals such as hydrogen peroxide and synthetic fuels.

Range of Estimates

In order to reduce the hazards of appraising the extent of possible industrial expansion over a period of some 15 years in the future—the trends of which would be complicated by the inability of the most expert to anticipate technological changes—two ranges of estimates were selected. The minimum expectable range was that obtainable from the continuation of current trends and the known plans of individual industries. The maximum expectable range generally was set to reflect feasible power requirements, assuming that the policies of the federal government and industry will encourage the most rapid development of power resources and industry in the Pacific Northwest.

A basic assumption adhered to within other limiting factors was that the Pacific Northwest should prepare itself to have enough power capacity to provide for continuous industrial production. It was felt that, inasmuch as electric power is an essen-

tial tool of production, the extent of its availability should never be permitted to be a limiting factor upon the expansion of potential industrial production capability. Had such a basic and essential policy been adopted by appropriate agencies of government since the end of World War II, the Pacific Northwest and the West Coast generally would not be faced with existing critical power shortages and resulting slowdown in industrial expansion.

The total estimated demands for firm energy in the Pacific Northwest by the year 1960 were thus developed. The truly fabulous total industry range of 3,641,450 to 5,384,100 kilowatts was arrived at for 1960. The extent of this anticipated growth is demonstrated by comparison to the 1945 requirements of 977,000 kilowatts—a percentage increase of between 275 to 450 per cent. The details of these forecasts are shown in Table 1, "Summary Table—Estimated 1960 Range of Production and Power Requirements for Selected Pacific Northwest Industries."

Most startling of the estimates are those relating to light metals and particularly aluminum. The percentage Pacific Northwest production increase—1946-1960—for aluminum alone is indicated at 778-1116 per cent, representing a production capacity of between 1,300,000-1,800,000 tons as against current primary reduction capacity of about 300,000 tons, and a current national total of 680,000 tons.

The analyses on aluminum, probably the most extensive of the entire report, are carefully bulwarked with appraisals of markets and production cost trends. Extensive contact with both consuming and producing segments of national industry resulted in a rational estimate of national requirements for aluminum. These are

summarized in Table 2, "United States Outlook for Feasible Markets for Aluminum, 1960."

Because of the industry's imperative requirements for large blocks of firm and low-cost electric power, and the enormous potentials of this type of power in the Pacific Northwest, it is concluded that a large portion of future total national aluminum production capacity will become established in that area. Recognition is given in this appraisal to the possibilities of atomic energy production in areas favorably situated in relation to sources of bauxite and alumina. In this respect, allowance is made for the establishment of alumina plants in the Pacific Northwest to be supplied by imported bauxite and supplemented in time with non-bauxitic materials for which it is assumed advanced technology will provide ultimate opportunity of utilization.

The allocation of power capacity for the Pacific Northwest aluminum industry expected to be established in 1960 is shown in Table 3, "Pacific Northwest Power Use for Aluminum, 1960." The related levels of employment which would result are summarized in Table 4, "Pacific Northwest Employment in Aluminum, 1960." Al-

TABLE 1
Summary Table—Estimated 1960 Range of Production and Power Requirements
for Selected Pacific Northwest Industries

Industrial Product	Estimated 1960 Pacific Northwest Production — Tons	Estimated 1960 Power Demand—KW Pacific Northwest	% Production 1946 - 1960 Increase
Primary aluminum	1,300,000 - 1,800,000	2,865,000 - 4,135,000	778 - 1116%
Primary magnesium	6,000 - 25,000	13,600 - 55,000	
Rolled steel	400,000 - 480,000		38 - 66
Rolled stainless steel	6,000 - 20,000		
Steel castings	40,000 - 50,000		85 - 130
Iron castings (incl. c.i. pipe)	150,000 - 190,000	131,100 - 252,800	101 - 154
Malleable iron castings	6,000 - 8,000		
Ferro alloys	55,000 - 100,000		83 - 233
Electrolytic iron	5,400 - 36,000		500 - 3900
Electrolytic manganese	7,000 - 15,000		
Primary slab zinc	265,000 - 340,000		25 - 60
Primary refined lead	130,000 - 180,000		86 - 157
Primary refined copper	125,000 - 175,000	250,000 - 327,000	67 - 133
Primary antimony	3,000 - 5,000		25 - 108
Cement	1,500,000 - 1,700,000		62 - 83
Artificial abrasives	18,000 - 32,000	50,000 - 62,500	
Phosphorus	100,800 - 186,000		
Phosphoric acid	400,000 - 625,000		535 - 892
Phosphates	30,000 - 40,000		
Triple superphosphates	350,000 - 550,000		843 - 817
Sulfuric acid	226,000 - 380,000		277 - 533
Calcium carbide	70,000 - 140,000	331,750 - 561,800	159 - 419
Chlorine	85,000 - 122,000		112 - 212
Caustic soda	109,000 - 158,000		137 - 243
Chlorates and perchlorates	4,600 - 7,000		2 - 56
Carbon disulphide	25,000 - 27,000		
Rayon	67,500 - 87,500		

TABLE 2
United States Outlook for Feasible
Markets for Aluminum, 1960

Feasible markets	Estimated aluminum requirement (million pounds)	
	Minimum	Maximum
Building products	350	700
Automobiles	285	1,380
Displacement of copper* ..	250	450
Wire and cable	175	300
Other uses	75	150
Trucks	211	968
Light	3	9
Medium	175	810
Heavy	18	81
Trailers	15	68
Buses	40	56
Railroad cars	51	88
Aircraft	51	109
Displacement of zinc die castings*	34	52
All other uses	2,500	2,500
Total	*3,772	*6,303

*There is some duplication of figures representing displacement of copper and zinc because of the use of these metals in automobiles, trucks, and buses for which aluminum estimates were made without an analysis of metals displaced.

TABLE 3
Pacific Northwest Power Use for
Aluminum, 1960

Power use for aluminum	Thousands of kilowatts	
	Minimum	Maximum
For reduction capacity as of 1947	650	650
For rolling capacity as of 1947	50	50
For aluminum needed for Alcoa, 1947 capacity	15	25
For additional reduction capacity by 1960	2,000	3,000
For additional alumina capacity by 1960	150	400
Total	2,865	4,125

though considerable attention was given during the preparation of the report to the potentials of Pacific Northwest aluminum fabricating industries — foil, extrusions, castings and so on — the difficulties of specifically appraising markets and technological advances in these fields coupled with time limitations for required studies made it desirable to eliminate forecasts at that time.

Determination of magnesium potentials provided considerable difficulties. The state of flux in the fabricating portion of the industry, reflecting into uncertainties as to the national outlook for primary production, made it necessary to exercise considerably more diffidence in forecasts than for almost any other industrial group. However, it seemed justified to provide for the ultimate 1960 Pacific Northwest production of between 6,000 to 25,000 tons of the primary metal, entailing power capacity requirements on the order of 15,000 to 55,000 kilowatts. The report concludes that the greatest obstacle to the large-scale production and use of magnesium is the cost of fabrication. It observes the paradox that lower costs await large-scale production while a larger market awaits the development of lower costs.

The report's general conclusions on ferrous metals and related industries may prove somewhat disappointing to those expecting very large expansion in the Pacific Northwest. However, the analyses reflect a realistic appraisal of the effect of recently increased ferrous metals' capacity in California and Utah, as well as the limitations of raw materials available in and to the Pacific Northwest for the establishment of large basic production. However, as shown in Summary Table 1, "Estimated 1960 Range of Production and Power Requirements for Selected Pacific Northwest

TABLE 5
Estimated Annual Power Requirements in the Production of Steel Ingots and Rolled Steel in the Pacific Northwest, 1960

Item	Kilowatt demand	
	Minimum	Maximum
Total	42,000	71,000
Existing rolling mills		
Portland, Oregon	15,000	20,000
Seattle, Washington	20,000	30,000
Mills to be constructed		
Seattle, Washington	7,000	15,000
Conversion of open hearth ingot capacity to electric furnace ingot capacity—Seattle		6,000

TABLE 6
Pacific Northwest Accessible Markets for Cast Iron Pipe and Fittings, 1960

Accessible market	Minimum Net tons		Maximum Net tons	
Pacific Northwest states.....	53,000		70,000	
Alaska and Hawaii.....	2,000		3,000	
Western Canada	3,000		4,000	
Other foreign countries.....	2,000		3,000	
Total	60,000		80,000	

TABLE 4
Pacific Northwest Employment in Aluminum, 1960

Plant	Productive capacity (thousands of tons)		Minimum Maximum Employment	
	Minimum	Maximum		
Alumina	1,900	2,900	5,000	7,000
Aluminum reduction	1,300	1,800	15,000	21,000
Aluminum rolling	150	150	5,000	5,000
Total			25,000	33,000

Industries," percentage increases for various segments of the industry are by no means insignificant.

Notable for forecasted expansion are the ferroalloys and electrolytic iron, both of which are highly dependent on abundant quantities of low-cost firm electrical energy. Relative to electrolytic iron production, the report observes that if current production of high-quality iron powder on a somewhat small scale in the Pacific Northwest were to demonstrate the feasibility of low-cost production, the large market for this product would assure substantial development of this industry in the region. Tables 5 and 6 reveal some details of the market appraisals for steel ingot, rolled steel, cast iron pipe and fittings as estimated for 1960.

With respect to nonferrous metals—copper, lead and zinc—the report's forecasts rest in large measure on the raw materials factors for these industries. The

favorable position of the Pacific Northwest in its ore reserves of all three metals is described at some length particularly with respect to the renewed attention and interest in such mining districts as those of northern Idaho and eastern Washington for both zinc and lead, and of Butte for copper. The steady trend to electrolytic refining in zinc, for example, coupled to the nature of the raw material reserves from which the industry must draw its major supplies provides production estimates for 1960 which are shown in tabular form in Table 7, "Estimates of Production of Zinc Concentrates and Zinc Slab in the Pacific Northwest, and Power Requirements, 1960." A similar tabulation is shown for lead in Table 8.

Establishment of additional cement production capacity is discussed in the report's section on non-metallic industries, and summarized in Table 9, "Estimates of Portland Cement Production and Power

TABLE 7
Estimates of Production of Zinc Concentrates and Zinc Slab in the Pacific Northwest and Power Requirements, 1960

Item	Annual power requirements Kilowatt demand		Annual Production of concentrates and zinc slabs (Net tons)	
	Minimum	Maximum	Minimum	Maximum
Total			150,000	194,000
Zinc mining and concentrating, total.....	300,000	380,000	24,000	32,000
Northeastern Washington	60,000	80,000	5,000	7,000
Southern Idaho	25,000	40,000	2,000	3,000
Northern Idaho	140,000	160,000	11,000	14,000
Western Montana	75,000	100,000	6,000	8,000
Zinc slab, total.....	265,000	340,000	126,000	162,000
Tidewater*	60,000	80,000	30,000	38,000
Southern Idaho		30,000		14,000
Northern Idaho	45,000	60,000	21,000	30,000
Western Montana*	160,000	170,000	75,000	80,000

*In the event tidewater plants are not established by 1960, it is expected that imported concentrates would continue to be processed in Montana. Consequently, the total power would remain unchanged.

TABLE 8
Estimates of Production of Lead Concentrates and Primary Lead Slab in the Pacific Northwest and Power Requirements, 1960

Item	Annual power requirements Kilowatt demand		Annual Production of Concentrates and Pig Lead (Net tons)	
	Minimum	Maximum	Minimum	Maximum
Total			32,000	45,000
Lead mining and concentrating, total.....	160,000*	200,000*	15,000	19,000
Northeastern Washington	15,000	25,000	1,500	2,500
Northern Idaho	110,000	125,000	10,000	11,000
Southern Idaho	15,000	25,000	1,500	2,500
Western Montana	20,000	25,000	2,000	3,000
Pig lead, total	130,000	180,000	17,000	26,000
Tidewater (smelting and refining).....	20,000	30,000	3,000	5,000
Northern Idaho (smelting and refining).....	75,000	90,000	12,000	15,000
Southern Idaho (smelting and refining).....		20,000		3,000
Western Montana (smelting)	35,000	40,000	2,000	3,000

*Lead content approximately 75 per cent, or 120,000 and 150,000 tons.

Requirements in the Pacific Northwest, 1960." The report observes that the consumption of cement in the region has been higher than the national per capita use because construction and related developments are proceeding at a high rate in the area. It further observes that this is to be expected because of the very large growth of population, and the consequent rising demands for highways, dams, residential and commercial building and the like, all of which require increasing tonnages of cement.

The current construction of one of the nation's largest artificial abrasive plants in Vancouver, Washington, serves to highlight the report's appraisal of this industry's future in the Northwest. The demands—domestic and export—for fused alumina, silicon carbide and other artificial abrasives, translated into the high power requirements per unit of material produced, provide an estimate of between 13,000 and 22,000 kilowatts by 1960. This would correspond to the production of between 8,000 to 12,000 tons of silicon carbide per year, and 10,000 to 20,000 tons of fused alumina.

As indicated in Summary Table 1, one of the largest increases in Pacific Northwest industrial capacity is expected in the field of phosphorus and related chemicals. The report's forecast, derived in 1947, already appears to be conservative in view of increasing interest in Western phosphate deposits and current plant construction in southern Idaho and Utah.

TABLE 9
Estimates of Portland Cement Production and Power Requirements in the Pacific Northwest, 1960

	Annual Production of Portland Cement (barrels)		Annual power requirements Kilowatt demand	
	Minimum	Maximum	Minimum	Maximum
Total	8,135,000	9,000,000	37,000	41,000
Southwestern Oregon	680,000	760,000	3,100	3,500
Northeastern Oregon	375,000	420,000	1,900	3,100
Lower Columbia River Area.....	790,000	840,000	3,300	3,700
Eastern Washington	1,400,000	1,470,000	8,100	9,100
Puget Sound Area.....	4,550,000	5,130,000	19,200	21,000
Southern Idaho	340,000	380,000	1,400	1,500

It may be observed that the national demands for phosphatic fertilizer and for the large variety of phosphorus chemicals are running headlong into Pacific Northwest power stringencies. If it were not for the lack of adequate firm supplies, the phosphorus industry would undoubtedly be moving into high gear in the vicinity of the phosphate deposits in Montana, Idaho, Utah and Wyoming. Table 10, "Estimates for Phosphate Industry in the Pacific Northwest, 1960," tabulates the requirements for various phosphorus consuming industries.

One of the report's conclusions, developed by intensive studies for several years, relates to the need for the production of high concentration phosphatic fertilizers so as to reduce the cost of contained plant food to the ultimate farm consumer. The report also details at length the rapidly growing needs of soils west of the Missis-

TABLE 10
Estimates for Phosphate Industry in the Pacific Northwest, 1960

Consuming industry	Annual kilowatt demand	
	Minimum	Maximum
Total	194,900	355,800
Phosphate rock mining—total	9,000	15,000
Phosphoric acid.....	(*)	(*)
Phosphates	1,000	2,000
Phosphate fertilizer.....	8,000	13,000
Electric furnace operations—total	165,500	306,000
Phosphoric acid	1,500	3,000
Phosphates	24,000	73,000
Phosphate fertilizer.....	140,000	230,000
Other operations—total.....	20,400	34,800
Phosphoric acid.....	(*)	(*)
Phosphates	1,000	2,000
Phosphate fertilizer.....	19,400	32,800

*Small amount is included in electric furnace operations.

issippi for phosphatic plant food, the supply of which will be derived from plants in

• Aerial view of the Simplot Fertilizer Plant at Pocatello, Idaho, which is among the producers of superphosphate in the West.



the West and especially in the Northwest.

Relative to the demands for phosphorus chemicals other than fertilizer, the report indicates that past national production of calcium, sodium and ammonium phosphates for soaps, cleansers, and food industries has been concentrated in the east. It further states that Western demands for these essential products and the availability of 60 per cent of the nation's phosphate reserves in the West assure the expansion of the industry in the West.

Although not a large consumer of power, but because it is essential to the growth of industry, sulfuric acid draws a major share of attention in the report. The anticipated size of consumer demands for the acid are tabulated in Table 11, "Estimated Market in 1960 for Sulfuric Acid in the Pacific Northwest, Exclusive of Southern Idaho and Utah." Among these estimates, those for rayon production account for the greatest potential amount.

Calcium carbide, the Western production of which was unknown prior to the war, is given considerable attention. A heavy power consumer, that industry is expected to grow considerably, as shown in Table 12, "Estimated Market for Calcium Carbide Accessible to the Pacific Northwest." Its importance, discussed at length, lies in the development of numerous industrial substances for which acetylene is a base. These include acetic acid, acetic anhydride, tetrachloroethane, vinyl acetate and vinyl acetylene.

Particular attention is drawn to the requirements of the synthetic rubber industry for acetylene, and of the rayon industry for acetic acid and acetic anhydride. The latter two are regarded as most important to the development of cellulose-using industries in the region, and to the greater utilization of its timber resources. Because calcium carbide production requires large quantities of power, it is estimated that between 27,000 and 54,000 kilowatts will have to

TABLE 11
Estimated Market in 1960 for Sulfuric Acid in the Pacific Northwest, Exclusive of Southern Idaho and Utah
(Tons 100 per cent acid basis)

Use	Minimum	Maximum
Total	226,000	380,000
For superphosphate fertilizer—total	74,000	109,000
In northern Idaho.....	12,000	28,000
In western Montana.....	50,000	57,000
Along Pacific Northwest Coast	12,000	24,000
For ammonium sulfate fertilizer at Salem.....		61,000
For rayon manufacture at Tidewater.....	100,000	124,000
For sugar refining.....		7,000
For alcohol by wood waste process	5,000	8,000
For chlorine and caustic soda manufacture.....	2,000	3,000
For aluminum sulfate manufacture	11,000	14,000
For explosive manufacture	12,000	15,000
For other uses	22,000	39,000

TABLE 12
Estimated Market for Calcium Carbide Accessible to the Pacific Northwest, 1960 (Tons)

Use	Minimum	Maximum
Total	70,000	140,000
Total—cutting and welding of metals.....	48,000	60,000
Bottled acetylene—Pacific Northwest.....	9,000	11,000
Acetylene, shop-generated—Pacific Northwest.....	7,000	10,000
Bottled and shop-generated acetylene—Other Western states.....	32,000	39,000
Total—synthetic chemicals	18,000	75,000
Pacific Northwest	18,000	50,000
California		25,000
Exports	4,000	5,000

be provided for this industry in the Northwest by 1960.

The Pacific Northwest is already a major producer of chlorine, caustic soda and related chlorine chemicals. The major outlet for Northwest production has been in the pulp and paper industry, and it is the report's conclusions that these will continue to furnish major markets. These are shown in Table 13, "Estimated Market for Chlorine Accessible to Pacific Northwest Producers, 1960." Inasmuch as the production of chlorine and caustic soda ranks at the top of power consumers, between 46,000 to 66,000 kilowatts will be required to service that industry.

Carbon disulphide, important to the manufacture of viscose rayon, is discussed in the report for that reason. Although it is admitted that the bulk of national production of this chemical has been accomplished in externally fired retorts, it is believed that Pacific Northwest factors will favor electric furnace methods. The report estimates the need for some 135,000,000 to 150,000,000 pounds of carbon disulphide in the region by 1960, with power requirements in the vicinity of 3,000-4,000 kilowatts.

One of the constant hopes of the Northwest has been for the establishment of rayon manufacture. It seems clearly uneconomic for the region to ship its dissolving cellulose pulps to eastern rayon plants, with return shipments of finished rayon products to the Pacific Northwest. The report concludes that the rapid growth of Western population and particularly the expansion of its garment and textile industry, and of its tire manufactures, should make it possible for the establishment of several rayon plants in the Northwest.

Thus, provisions for the establishment of several plants are made in the report's summary power requirements for a total of between 54,000 to 71,000 kilowatts of which 10,500 to 15,000 kilowatts would be purchased, the remainder self-generated from by-product steam. The capacity of the anticipated Pacific Northwest rayon industry is estimated at from 135,000,000 to 175,000,000 pounds per year by 1960.

Numerous other chapters in the Engineers' report deal with forest and agricultural product industries. With respect to timber products, the report notes the trend to greater manufacture of finished products even though the basic industry may adjust itself downward toward a drain on the timber resources more compatible to sustained yield principles. Reflecting increased manufacturing, and hence greater power utilization, the summary conclusion is that the forest industries of the Pacific Northwest will require on the order of 700,000 to over 1,000,000 kilowatts by 1960.

Agricultural production is anticipated to achieve increasing diversity, with great emphasis on local processing particularly in the production of frozen fruits and vegetables. Sugar beet production in 1960 is estimated to double estimates available for 1940-1944. Thus, the report estimates that total power requirements for agricultural processing industries will require well over a half million kilowatts of capacity.

Other chapters deal with railroad electrification and power demands in the home, the farm, commercial and small industrial establishments. Their compounded requirements together with those of industry reach the impressive total of almost 12,000,000 kilowatts.

TABLE 13
Estimated Market for Chlorine Accessible to Pacific Northwest Producers in 1960 (Tons)

Use	On minimum basis	On maximum basis
Total	85,000	122,000
For pulp bleaching	62,000	85,000
In Pacific Northwest	45,000	60,000
In British Columbia	15,000	20,000
In Alaska	2,000	5,000
For chlorinated solvents and other chemical manufactures.....	20,000	30,000
For water treatment and sanitation.....	2,000	5,000
For liquid bleach	1,000	2,000



• Cut-away boxcar exhibited at Oakland Naval Supply Center during Materials Handling and Packaging Conference shows requirement for eight-foot-wide freight car door to permit fork lift trucks to handle palletized loads without extra maneuvering.

Materials Handling Planning Takes on Major Status

By A. MAZZOLA
President, Materials Handling Association
of Southern California

IN THE midst of the vast and increasing scientific and technological developments, improvements and innovations in the science of materials handling the most striking development, and certainly the one which carries the most promise for the future of the industry, is neither scientific nor technological but psychological.

The most startling development in the field of handling material mechanically is an attitude or a state of mind — a receptiveness on the part of those most vitally concerned by this important phase of industrial processing.

During the last 10 years the attitude and thinking of the Western industrialist toward the science and adaptation of materials handling to his problems has undergone a profound and gradual change. We

find that over this gradual process of acceptance that materials handling has assumed the status of a major industry in the West with little if any fanfare. Nevertheless, the fact remains that materials handling in its broad and varied applications has become one of the principal frontiers of industrial development in the West.

There are naturally a considerable number of major and minor factors, some of them entirely unrelated to each other, which contribute to the general picture as it now exists. Among the major factors contributing to the vastly increased use of materials handling in the Western industrial plants and to the contemplation of even more extensive use of such facilities are, first, "The War Influence."

There can be no denying the fact that the production of war material on the coast had a tremendous after effect upon the production methods in common use. During a period when peak production was a top requirement and when the skilled labor was scarce or practically unobtainable, the development of materials handling in the West received a tremendous impetus.

Forced by the exigencies of the situation as it then existed, our methods and plant engineers, especially those in the aircraft and armament plants, met the situation by increasing the efficiency of the plant operation and placing a greater portion of the manufacturing and handling phases on a mechanical and sometimes automatic basis.

Thousands of men were employed in wartime both in these industrial plants and

in the armed services whose primary job was to expedite the flow of material either through processing or industrial operations or through receiving, warehousing and shipping operations.

Many of these engineers had come in contact with the application of materials handling on a large scale for the first time in their experience. The results left a lasting impression and the methods of obtaining such results created a vast store of experience which was later to prove beneficial to the entire Western industrial picture.

It was inevitable that at the close of the war these engineers, layout men and methods men should be dispersed from the highly concentrated war production areas throughout the entire West. Their accelerated experience and war time training were, by a process of natural distribution, soon located in the plant and methods engineering departments of plants throughout the area, both large and small. Many of the plants in which these men found themselves had not previously used handling equipment at all, or had used it to a much lesser extent than the experience of the men now in their employ would indicate as being both practical, economical and efficient.

The dissemination of these experienced men throughout the plants of the West has probably contributed more than any other single factor to the vastly increased interest in the materials handling field by all industry in general and those industries having heavy products to move in particular.

The second major factor to be considered can best be described as the "branch factory" influence. It is obvious to any careful observer that a very substantial percentage of the new plant facilities which are now under construction, or which have been built in the West within the last five years, represent Western branches of established concerns which have operated for many years in other parts of the country.

Best Practices Come West

This is not only a tribute to the increasing industrial importance of the West, but it is also a beneficial influence. These organizations which are establishing plants in the West and obtaining a foothold in this rapidly growing industrial empire are naturally those which have proven successful on their home grounds. Therefore, it is only the "cream" of the industrial organizations which can expand and locate in the Western states. Now since the most successful organizations must obviously be operated in an efficient manner in their home plants, it follows that these efficient practices, revised in order to conform with the latest developments in materials handling, are accepted as a matter of course in the Western branches.

Among the many large organizations establishing new plants in the West in the last few years are such as Bethlehem Steel, Ford Motor Company, Fisher Bodies, Revere Copper & Brass, Chevrolet and many

Examples of Outstanding Materials Handling Developments in the Last Year

DISTRIBUTION WAREHOUSES—(such as those used by grocery chains, drug chains, department stores) . . . Growing tendency toward palletizing storage. A mechanized picking line is used to assemble orders for delivery to retail outlets. This consists either of tractors towing trailer chains or individual trailers pulled through the picking lines by means of an endless chain.

PUBLIC WAREHOUSING . . . Increasing use is being made of the palletized unit load. The economy of handling offsets the loss in storage space caused by the need for wider aisles and space for pallets.

STORES DEPARTMENTS OF LARGE CORPORATIONS — (as for example, railroads) . . . Finding palletized handling reduces labor force needed and facilitates rapid turnover at stores, reducing the need for large inventory.

PAPER AND PRINTING INDUSTRY . . . Increasing demand for specialized material handling equipment. At the present time this is taking the form of a power truck designed specifically for handling rolls of paper. A clamp mounted on a rotating head enables the machine to draft rolls of paper either horizontally or vertically, and transport and deliver these rolls to storage.

others too numerous to mention. In each and every case where such organizations have established in this area, the mechanical handling of material has received major consideration from the time of the initial planning up until the moment the plant has been placed into operation.

The third major influence is the "cost factor." It is obvious, and it has been very aptly stated many times in various ways, that the cost of handling a product during

the process of manufacture adds nothing whatsoever to its value, but only adds to the cost of manufacture and therefore to the price of the product to the ultimate consumer.

Assuming that the price to the ultimate consumer is fixed, either by law or common acceptance, then any substantial increase in the cost of manufacture can only result in serious losses to the manufacturer and therefore any factor tending to reduce such cost is obviously of great value to those benefited.

There is a point naturally at which mechanization must stop because the returns are not comparable to the initial expenditure involved. However, this point has been moving upward during the last 10 years with the cost of labor practically double or triple the level of 10 years ago. It is obvious that the capital expenditure for time saving equipment can be greatly increased over the figures deemed acceptable 10 years ago and still be economically a very sound investment.

An instance of this sort of thinking is exemplified in a recent statement of a purchaser of materials handling equipment, that many of the units now under consideration as automatically operated and motor propelled units would not have been considered 10 years ago, since the cost of operating such units was so much less at that time that hand operated equipment would have been quite sufficient. However, under present economic conditions a considerably larger investment required to obtain automatically propelled equipment was considered both economically sound and practical.

Saves Labor and Accidents

The fourth major influence is the "labor influence." The fact that skilled labor is no longer interested, nor should they be required to do back-breaking manual labor, such as would be and has been required in the past for lifting and transporting heavy loads, is not an inconsiderable influence in promoting the use of certain types of materials handling equipment.

For instance, before the time that materials handling equipment was so generally accepted and available, it was not uncommon to lift and transport heavy loads practically by hand. This required not only time, which is of concern to the management from a cost angle, but also required the use of considerable physical effort over and above that normally required to perform routine manufacturing operations.

Such a situation is intolerable, and rightly so, to the working man who has a right to expect the advantage of some sort of mechanical assistance when called upon to lift or shift extremely heavy loads. It is not simply a matter of not liking to do this kind of work, but it has also been demonstrated that accidents are considerably reduced when the need for lifting and moving heavy loads by hand methods has been eliminated.



• Mr. Mazzola is president and chief engineer of Angelus Engineering Corporation of Maywood, California; president, Materials Handling Association of Southern California, and is a member of the ASME.

The fifth major influence in the development of a high level of materials handling consciousness could be called "the competitive influence."

It has been demonstrated time after time that if one plant in some particular industry, such as the foundry or fruit packing industry, installs a completely modern up-to-date plant embodying the latest developments in all technological fields, including the most efficient layout, their competitive position is vastly improved. Consequently, others in the same field are more or less forced to match the productive capacity of this efficient competitor or else continue to operate at a very serious disadvantage, provided, of course, that they can continue to operate at all, especially during times of strong competition within a given industrial field.

The last, but surely not the least, of these major factors is the engineering influence of those engaged in the fields of materials handling as engineers and consultants.

Those so engaged are fitted, or should be fitted, by training and experience to be familiar with the latest developments in all methods of materials handling and are generally in a position to promote methods which can if properly applied improve the efficiency and general operations of any plant to which they are so applied.

It would be amiss to overlook the influence of these men and organizations as well as the influence of the architect and consulting engineer who are becoming more and more conscious of the fact that materials handling should be designed into the plant at the time the preliminary plans are drawn and they should not be left to be installed as an after-thought, where and if they can be applied.

These engineers know that the least expensive way of overall plant efficiency is to plan this efficiency into the building, and that the most expensive way is to let it "just happen" after the operations have been started and certain fixed conditions cannot be changed, or at best can be changed only at the expenditure of a considerable amount of money.

In conclusion, it may be stated that the development of the materials handling industry is continuing to grow and the continued progress of this industry is closely geared to the future development of the industrial West.

Surely the greatest "strikes" among the 49'ers of the twentieth century working the Mother Lode of industrial productivity will come to those who are equipped with the latest and most modern tool of industrial production — materials handling.

Apprentice Training Meet

The second annual Western States Conference on Training will be held June 20-23, 1949, at Bellingham, Wash., it is announced.

• Wirebound crates are used in General Electric's new San Jose, California, plant to speed packaging. It takes less than a minute to package motors by this method.

Westward March in Review

(Continued from page 38)

tions; Douglas Aircraft Co., Santa Monica, \$3,500,000, Boeing fuselage sections; Gillillan Bros., Inc., Los Angeles, \$1,620,000 Civil Aeronautics contract for approach equipment; United Air Lines, \$6,650,000 San Francisco maintenance base.

Railroad investments to keep abreast of Western developments included:

Southern Pacific, bids on \$25,000,000 diesel-electric mainline and switch locomotives; Great Northern, \$5,000,000 new diesel-electrics; Spokane, Portland & Seattle Railway Co., \$3,000,000 diesel-electrics; Western Pacific, new gondolas, track, \$3,200,000; Great Northern, Cascade relocation, \$1,000,000; Union Pacific's \$8,000,000 Aspen tunnel, Wyoming.

Pacific Fruit Express Company planned 3,000 new refrigerator cars and Western Fruit Express Company added 1,500.

Growth of the West is further significantly stressed in development of the automobile industry in southern California, where four to five assembly plants turned out 154,000 cars in 1941, ranking the area second to Detroit, whereas nine assembly

plants now planned or operating are expected to produce from 600,000 to 650,000 cars annually once materials are available.

Ford Motor Company's plan to buy \$50,000,000 in parts and supplies annually in the West reached a \$35,000,000 figure in 1948. Ford's Lincoln-Mercury plant, opened in mid-1948, was the first to assemble Lincolns outside Detroit.

General Motors' new Chevrolet assembly plant at Van Nuys, Calif., inaugurated passenger-car production with an open house during which visitors watched passenger cars roll off production lines every three minutes and trucks five times an hour.

Willys-Overland Motors, Inc., Los Angeles, announced expansion of \$1,000,000 in plant equipment for production of passenger automobiles and trucks.

Studebaker announced plans for an assembly plant for Studebaker trucks in addition to the present West Coast assembly plant. Nash Motors has begun assembly operations at the El Segundo, Calif., plant.



Significance of Chemical

CHEMICAL wastes come from many types of industries, as well as from the producers of chemicals themselves, and consequently a wide variety of disposal problems is encountered, according to the presentation made by the California Association of Production Industries before the Dickey interim committee of the California legislature studying pollution questions.

For example, in one of the areas where pollution of water supplies is a matter of

grave importance, a large number of industries within a radius of a few miles discharge significant amounts of spent chemicals. These include chromates and cyanides in diluted waste flows, spent solutions of sodium thiosulphate, sodium sulphite and such organic reducing agents as hydroquinone.

Even in water purification itself, large slugs of salt brine and calcium carbonate sludge are discharged as waste. On the other hand, many of the spent chemical wastes of industry are relatively innocuous

materials such as insoluble residues from natural ores and gypsum sludge.

Further agricultural and industrial development is in a large measure dependent on the location of new and expansion of existing chemical industries in California, it is pointed out.

For example, plant capacity to produce enough rayon and cellophane to supply only the present population of the West (estimated at 66,000,000 pounds) would require a \$78,000,000 investment. This production would involve the use of 82,

LIMITATION TO USE OF THIS TABLE		CHARACTERISTICS OR PROPERTIES IMPORTANT TO CONSIDERATION OF DISPOSAL ON LAND OR IN WATER																		
NAME OF INDUSTRY		Inorganic Organic Acid Alkali Salt or Saline Suspended Solids Coagulant Oxidizing Agent Reducing Agent Detestable to Humans Detestable to Animals Detestable to Aquatic Life Damaging to Vegetation Food for Micro-organisms Bad Taste or Odor Harmful to Plants or Animals Factor in Spread of Disease Insoluble Component Temperature																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
FRUIT & VEGETABLE PROCESSING		Variety of problems as represented by major commodities processed, shown on next four lines.																		
Tomato		○	×	△	○	○	×	○	○	○	○	○	△	○	×	○	△	○	○	○
Peach		△	×	○	△	△	×	○	○	○	○	△	△	△	△	○	△	○	○	△
Olive		×	×	○	△	×	△	○	○	○	○	△	○	×	○	○	○	○	○	○
Citrus		△	×	×	○	○	×	△	○	△	○	○	○	△	△	△	×	○	○	○
FISH CANNING & REDUCTION		×	×	○	○	×	×	△	○	△	○	○	○	○	×	○	×	○	△	○
WINE MAKING & BRANDY DISTILLING		△	×	×	○	○	×	○	○	×	○	○	△	△	×	△	×	○	○	△
MILK PROCESSING		○	×	△	○	○	×	○	○	○	○	○	○	○	×	○	△	○	△	○
PULP & PAPER MANUFACTURE		Wide variations depending on process and type of raw material used, as shown on next two lines.																		
Sulfite Pulp		×	×	○	△	○	×	×	○	×	○	○	×	△	△	△	×	○	○	△
Kraft, Straw or Paperboard		○	×	○	○	○	×	×	○	○	○	○	△	○	△	△	△	○	○	○
OIL REFINING		×	×	△	△	△	△	○	△	○	△	△	○	○	△	△	△	○	×	△
OIL & GAS FIELD PRODUCTION		Significant variations between salt water and fresh water producing fields.																		
Salt Water Producing Fields		×	△	○	○	×	△	○	△	○	○	○	△	×	○	△	△	○	×	△
Fresh Water Producing Fields		○	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	×	○
CHEMICAL MANUFACTURE		Classification limited to three illustrative operations because of wide variations.																		
Sulfuric Acid		△	○	△	○	○	△	○	○	○	○	△	△	○	○	○	○	○	○	○
5,4-Dichlorophenoxy-acetic Acid		△	×	○	○	○	○	○	○	△	△	△	×	○	×	○	○	○	○	○
Iodine Recovery from Brine		△	○	×	○	×	○	○	△	○	○	△	○	○	○	△	○	○	○	○
RAILROAD MAINTENANCE		×	×	×	×	△	×	○	○	△	△	△	△	△	△	○	○	△	△	△
CANE & BEET SUGAR REFINING		×	×	○	×	×	×	△	○	○	○	△	○	×	○	△	○	○	○	○
SLAUGHTERING & MEAT PACKING		○	×	○	○	○	×	△	○	△	○	○	○	○	×	○	×	○	○	○
SOAP, OLIVE & GELATIN MANUFACTURE		Limited operations in California and insufficient information available.																		
STEEL MANUFACTURING & SMELTING		×	○	×	○	△	×	△	△	○	○	○	△	△	○	△	△	○	△	△
FABRICATION INDUSTRIES		×	×	×	×	△	×	△	○	△	△	△	△	△	○	×	×	○	×	△
MINING--PLACER (METALLIC)		×	○	△	○	○	×	○	○	○	△	△	△	○	○	○	○	○	○	○
MINING--NON-METALLIC		×	○	○	△	△	×	△	○	○	○	○	△	△	○	○	△	○	○	○
LOGGING & LOGGING		○	×	△	○	○	×	○	○	○	○	○	△	○	△	△	○	○	○	○
BREWING & GRAIN DISTILLING		Not material to present study since public sewers used almost without exception.																		
GAS & COKE PRODUCTION		Not material to present study since public sewers used almost without exception.																		
TANNING		Limited operations in California and insufficient information available.																		
TEXTILE MANUFACTURE		While no textile manufacturing industry has been developed yet in California, planning should anticipate needs.																		
OTHER INDUSTRIES CONTRIBUTING TO POLLUTION		Agriculture, commercial shipping, utilities treating water, the motion picture industry and many others have important volumes of spent chemical wastes.																		

Factors in Industrial Waste

500,000 pounds of wood pulp and cotton linters, 99,000,000 pounds of sulphuric acid, 79,200,000 pounds of caustic soda and 23,100,000 pounds of carbon bisulphide.

Phenol to serve the plywood, plastics, agricultural chemicals and petroleum refining industries would total 67,000,000 pounds a year by 1950. For plywood alone the phenol equivalent consumption in the West is stated at 12,000,000 pounds a year, and would increase 75 per cent or more if the resins were readily available. The petro-

leum industry use is estimated at 5,000,000 pounds and agricultural chemistry 3,000,000 pounds.

An intelligent policy in regard to disposal of chemical wastes, according to the C.A.P.I., would involve:

(1) A reasonable period of time in which industries can plan cooperative programs of improvement.

(2) Reasonable use of water where sufficient quantities are available, for carrying away industrial wastes.

(3) Reasonable use of public facilities and option of the industry to treat and dispose of its own wastes.

(4) Establishment of zones of disposal in which a degree of pollution is to be tolerated.

(5) Coordination of enforcement activities, so that corrective action is taken only against the public authority which has agreed to accept such industrial wastes rather than against the contracting industry.

Explanation of Basis for Preparation of the Table Together with Cautions Against Use in Analysis of Specific Problems

(As prepared for Western Industry by the California Association of Production Industries)

When the program of the California Association of Production Industries was defined by the member industries, principal emphasis was directed toward the need for exchange of information between industries. By such exchange it was hoped that the differences as well as the similarities of the many problems would be recognized by both industry and governmental authorities. It was believed such mutual understanding is essential to rapid progress toward orderly economical solution of water pollution problems associated with need for disposal of industrial wastes.

Throughout their studies the representatives of California's industries have limited their concerns to consideration of problems characteristic of this state. It has been recognized that the factors of industrial waste disposal problems are varied in relationship one to the other where disposal must be accomplished in semi-arid localities. Problems of disposal encountered in localities of concentration of industry in California require different solutions than where the rainfall is distributed over the four seasons and the rivers flow all year.

This classification of the significance of chemical factors was prepared in order to illustrate the types of studies of particular industrial waste characteristics that should be considered at the initiation of any cooperative planning efforts.

At most, the table indicates problems of water pollution that may be associated with industrial waste disposal in California. In no wise is it to be considered a check list to be used in analyzing situations outside of California and applies within the state only in situations visualized by the authors to be typical for present or probable future locations of the several industries listed.

The judgment on the importance of the chemical factors is that of but a few authorities, so there can be wide difference of opinion on conclusions, depending on personal appraisal of the importance of the factors under varying conditions.

Beyond the limitation to use of the table set forth in the notes on the table, it is to be understood that the information is not to be used as the basis of appraising the needs of any specific pollution situation, existing or potential.

No effort has been made to segregate the significance of the factors as to whether they are factors of untreated or treated wastes. Suffice to state that all factors listed must be considered in planning details of waste treatment facilities, but such treatment may or may not alter the significance of some of the factors. In many cases no treatment is available which will eliminate a particular factor completely, nor may it be necessary to do so after the other factors are changed in importance by treatment.

Finally, it must be recognized that any use of a table of this type is further limited when classification of either characteristics or effects of industrial wastes disposal is not also correlated with considerations of environmental conditions at the specific area of disposal.

POSSIBLE EFFECTS OF DISPOSAL ON LAND OR IN WATERS												
	Changes pH	Causes Taste or Increase Solids, Color, etc. & Turbidity	Causes Sludge Banks	Destroys Vegetation	Accelerates Corrosion of Metal or Concrete	Increases Shrinkage & Cracks in Concrete	Affects Oxygen Content, to Fish, etc.	Increases Turbidity of Water to Fish, etc.	Flights or Damages Soil	Creates Turbidity	Creates Color	Causes Grass or Oil Blank
	x	o	x	o	Δ	x	o	o	Δ	Δ	o	
	Δ	Δ	x	Δ	o	x	o	Δ	Δ	Δ	o	
	Δ	Δ	Δ	Δ	Δ	o	x	o	o	o	o	
	x	x	Δ	Δ	x	x	o	o	Δ	x	o	
	o	o	x	o	x	o	o	x	x	x	x	
	x	o	x	Δ	x	o	Δ	Δ	Δ	x	o	
	Δ	o	Δ	Δ	o	x	o	o	Δ	Δ	Δ	
	Δ	Δ	x	Δ	Δ	x	Δ	o	x	x	o	
	o	o	x	Δ	Δ	x	Δ	o	x	x	o	
	Δ	Δ	Δ	o	Δ	Δ	Δ	o	o	Δ	x	
	o	Δ	Δ	Δ	Δ	Δ	o	o	o	o	x	
	o	o	Δ	o	o	o	Δ	Δ	o	o	x	
	x	o	Δ	o	Δ	o	o	Δ	o	o	o	
	o	x	o	x	o	o	x	o	o	o	o	
	x	o	Δ	o	Δ	o	o	Δ	Δ	o	o	
	x	Δ	Δ	Δ	o	Δ	Δ	x	Δ	Δ	x	
	o	o	x	o	o	Δ	o	o	x	o	o	
	o	o	x	o	o	x	o	o	x	Δ	x	
	Δ	Δ	Δ	o	o	o	o	Δ	Δ	Δ	Δ	
	Δ	x	Δ	Δ	Δ	o	x	Δ	Δ	Δ	x	
	o	o	Δ	o	Δ	o	o	x	o	o	o	
	Δ	Δ	x	o	o	o	o	Δ	x	o	o	
	Δ	Δ	Δ	o	Δ	Δ	o	Δ	Δ	Δ	o	
x	Characteristic or Effect is important to overall planning for waste disposal under average conditions.											
Δ	Characteristic or Effect may be significant under a number of California situations.											
Δ	Characteristic or Effect may be important and will be encountered occasionally in California.											
o	Characteristic or Property is unimportant, or Effect is unlikely to be produced.											

New Method of Rust Prevention Incorporated in Wrapping

THE obvious basic purposes of packaging is protection. In the wrapping of metal articles this protection must be two-fold. Not only must the packaging protect from the damage of denting or breaking, but also it must guard the metal from rust.

On the basis of this second need in packaging metal, the Shell Development Company launched an intensive research and field testing project to find a means of giving packaging material this corrosion protective capacity.

Their work resulted in the development of a vapor phase inhibitor which is a slightly volatile corrosion inhibitor applied to paper wrapping material. After meeting all the standards set in laboratory testing, the product was put into application for commercial and industrial use.

A look at the causes of corrosion and a

check of the methods of metal preservation will give an idea of the basic concepts involved in the new method. Moisture and oxygen in the air cause the chemical reaction in steel which is the formation of rust. Oxygen in air does not vary in quantity, but moisture does. The removal of oxygen and its exclusion from a container is costly and seldom practical.

As a result, a means of minimizing direct contact of moisture with metal has been the most frequent method of obtaining protective packaging.

A common method has been the application of temporary oil or grease coatings directly on the metal. The object is then packaged in water-vapor barrier wrappings. Another method is the placing of strong moisture absorbing materials with the metal to be protected in sealed water-vapor-proof air-tight containers. In other

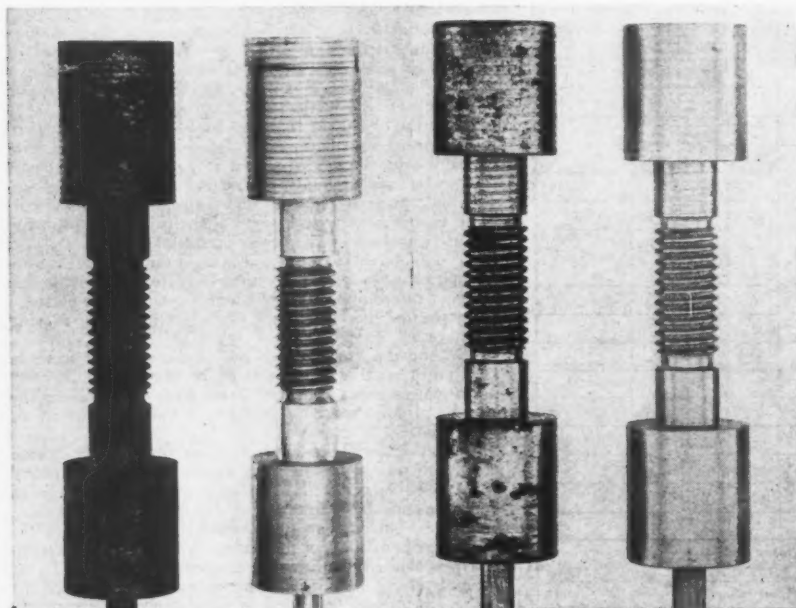
cases a combination of these two is used. These methods were developed to fairly high efficiency during the war.

The new approach to the problem prevents corrosion even though moisture and oxygen are present and does not require exclusion of these corroding agents. The vapor phase inhibitor coating on this asphalt laminated kraft prevents corrosion of bare ferrous metals which are wrapped in it. This holds in highest humidity conditions and the vapor phase inhibitor does not have to be in direct contact with the steel.

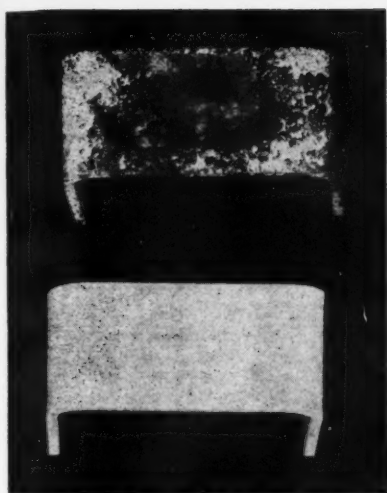
The vapor phase inhibitor is an organic chemical compound and is slightly volatile which permeates the air around the steel, vaporizing slowly and making condensed or absorbed moisture on steel incapable of causing corrosion. The protection is held at a high level as long as the metal is near v.p.i. coating and the v.p.i. does not affect pH or acidity because it is a neutral compound, nor is it consumed by its action of protecting. Sixteen thousand cubic feet of air is saturated by only one gram of the vapor at room temperature, and due to its low volatility v.p.i. will remain in a package for an extended period. Tests to date indicate that under severe conditions of temperature and humidity, protection can be counted on for a month when a 30-pound v.p.i. kraft is used as sole wrapping, six months with an over-wrap, five years with asphalt laminated kraft over-wrap and five years with an over-wrap of foil-laminate.

Under ordinary conditions protection for one to two years is expected. Simple fold closures secured by string or gummed tape are considered adequate provided no large breaks occur or large openings are made. In the case of over-wrapping for long periods, more careful attention to tight closures is indicated, but it is doubtful that hermetic sealing is needed.

The value of this new method of packaging is clear when it is realized that the object packaged may be taken out on arrival, or when needed for use, and contrary to prior methods, it is ready for



* Left, machined SAE 1020 steel bar, after being unsheltered outdoors in industrial-marine atmosphere two years. Next, the same kind of bars cleaned, wrapped in v.p.i. paper and over-wrapped with 60-60-60 kraft-asphalt-kraft. Third, bars in same outdoor atmosphere six months. Fourth, same item cleaned, wrapped in wax coated v.p.i. paper.



• Sand-blasted mild steel strips in humidity cabinet at 120°F. for 2,000 hrs. Top, without protection. Below, wrapped in v.p.i. paper, over-wrapped with 0.5 mil aluminum foil.

immediate use, no degreasing or solvent washing being required to remove temporary protective compounds.

General types of articles for which the Angier v.p.i. is intended as a protective wrapping include: articles made of bare steel or aluminum, or containing bare components of these metals, and coated steel objects which require supplementary protection to prevent rusting at points of imperfection in coating. In the latter group are chrome-plated, tin-plated, oil-coated or lacquer-coated objects made of metal.

In general, effective use of this v.p.i. requires that the coating be close to the metal surfaces to be protected, and that the air which may enter the finished package should pass over or through the coating before it reaches the metal surfaces.

Shell Development has licensed Angier Corporation of Framingham, Mass., to produce this wrapper.

Pre-Packaging Faces Mechanical Problems

Greatest stumbling block to the advance of pre-packaging at shipping point is that practically all fresh fruits and vegetables offer a wide range of variables so that mechanization is difficult, reports E. M. Seifert, Jr., Salinas.

Most grower-shippers do not want to change from bulk packaging to pre-packaging at this time, he said, but realize its possibilities and many are continuing to pre-package experimentally. In bulk packaging, it is pointed out, a wide range of quality is commercially permissible, whereas in packaging 95 per cent of products would have to be delivered in garden-fresh or orchard-fresh condition.

Seifert pointed to the variables in marketing carrots. "Try to visualize carrots being mechanically harvested, washed, graded and packed, remembering that they vary from five to 13 inches in length and from 1/2 to 2 1/2 inches in diameter," he said.

Beryllium Copper Molds Reduce Tooling Costs

BY MEANS of a new process for the fabrication of molds from beryllium copper, sometimes known as beryllium bronze, a number of Western die casters and plastic molders have recently been able to minimize one of their oldest handicaps — the high cost of production tooling.

The process might be described as a combination of three older techniques—hobbing, casting, and press forging — since it necessitates the use of an air-hardened steel pattern in order to create the subject molds from beryllium copper in alternately fluid and semi-fluid conditions. Compared with more conventional methods of fabricating molds for plastics and die casting, it has the following specific advantages:

(1) Does not require the long hours of painstaking work necessary to machine mold cavities from tool steel.

(2) Permits the use of patterns, or hobs, with thin sections which would be broken if used to hob cavities in a conventional manner (i.e., by forcing them to penetrate the surfaces of annealed steel blankets at room temperature).

(3) Yields molds which have better physical properties than the molds made by sand or investment casting method. In fact, beryllium copper molds are in several respects superior to the most expensive types of steel molds.

According to officials of W. S. Harmon Company at Los Angeles, the economic advantages of the process are particularly

great when two or more mold cavities are required — either for multi-cavity molds or for duplicate molds. As many as 50 identical cavities have been made with a single hob having surface dimensions of as much as 144 square inches and irregular parting lines without a loss of clarity in details or detectable variations in density.

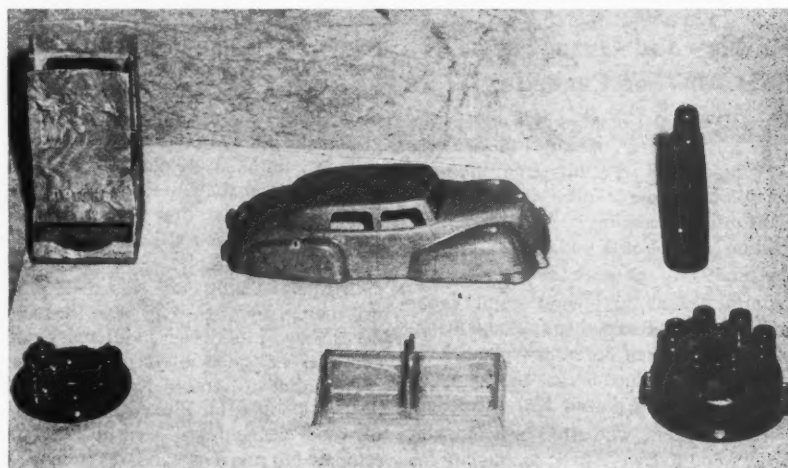
The alloy that makes the process practical is copper with about two per cent beryllium added, and can be classified as a precipitation hardening material. It is particularly suitable as a tooling alloy for operational temperatures of less than 1000° F. because it is highly machinable in the annealed condition and may be heat treated for the following properties:

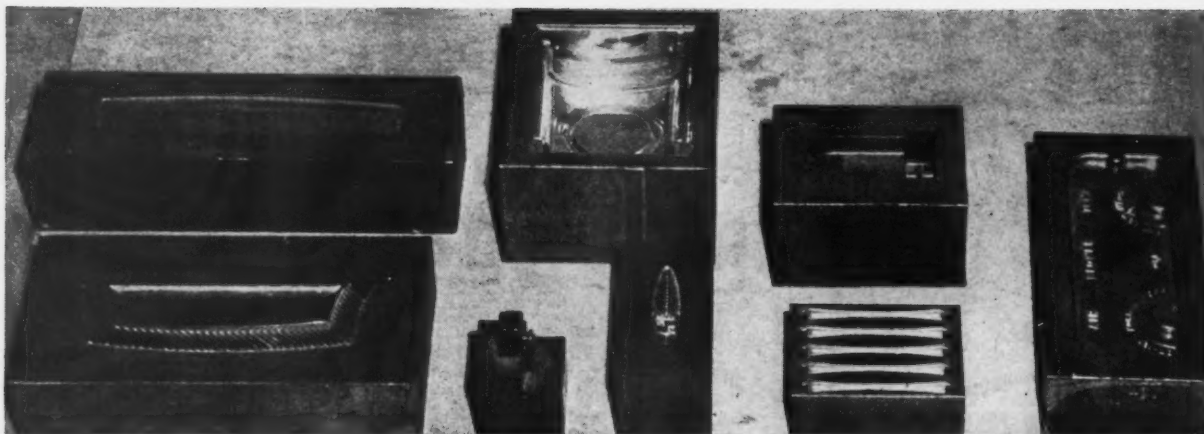
Tensile strength.....	180,000 p.s.i.
Hardness.....	C46 Rockwell
Thermal conductivity.....	25%
Electrical conductivity.....	30%
Yield strength.....	150,000 p.s.i.
Elongation in 2 inches.....	1 to 2%
Corrosion resistance.....	Excellent
Normal casting shrinkage.....	0.004 in. per in.

In the initial mold-fabrication operation, the molten beryllium copper alloy is usually poured around a master steel hob. Then, as cooling action takes place, pressure is applied to the cast metal by means of hydraulic press equipment so as to eliminate the porosity and lack of density that would otherwise characterize the solidified mold casts.

Hobs for this work are made from steels with a high-draw temperature (1100° F. or more) and ability to retain a minimum

• Here are some typical plastic products molded in the new beryllium copper molds.





• Some typical beryllium copper molds which were produced by new process to help minimize the high cost of production tooling.

hardness of about Rockwell C50. Such alloys include number one hot form vanadium, pure-ore D-C-66 Kloster, and Cro-Mow Crucible. All are air-hardening materials, and must be fabricated as hobs in conformity with the following general specifications:

(A) Bases must have a minimum thickness of two inches. Two or more $\frac{1}{2}$ -13 holes can then be tapped in each base at appropriate bearing points, so that the hobs can be attached to casting retainers.

(B) Width and length dimensions of a hob block must comprise even inches. For example, a $2\frac{1}{2}$ "x $3\frac{3}{4}$ "x2" cavity block should be castable to 3"x4"x2" dimensions. Or if round blocks are required, dimensioning should facilitate casting in multiples of even half inches.

(C) Approximately $\frac{1}{8}$ " tolerance should be allowed on a parting line at the top of a hob, so that the resultant cavity face can be satisfactorily machined, except where irregular parting lines are necessary — in which case the top dimensions should be precise.

(D) A draft of 5 to 10 degrees should

be allowed when details such as letters or numerals are essential.

(E) The hob should be buffed and polished for the same finish that is desired in a beryllium copper cavity.

Despite the use of pressure in fabricating beryllium copper cavities, mold impressions can be readily annealed for machine finishing by soaking for three hours in an air-circulating muffle furnace at 1450 to 1475° F. followed by a cold-water quench.

Machine finishing, welding, soldering, and sometimes electroplating operations are required to add uncastable details to the cavities so that the latter can be used as production molds. Such details normally include gates, sprues, knockouts, core pins, etc. Welding and soldering techniques are used to assemble separate cavities as multi-cavity molds, and cavity plating is desirable when mold surfaces require a special finish — e.g., a chrome finish for the molding of rubber products.

Where machining must be accomplished with a lathe, roughing is done at a surface speed of about 180 feet per minute and finish cuts are made at surface speeds of approximately 200 feet per minute. Similar

speeds prevail in work with shapers and milling machines, although roughing cuts with the latter must sometimes be reduced to about 120 feet per minute surface speed.

Peripheral speeds for drilling range from 30 feet per minute for large-size drills to 35 feet per minute for small-size drills; for tapping, 10 to 20 feet per minute — depending on the sizes of taps and other considerations. Carbon steel and Carbide cutting tools are respectively used for short and long runs, and may be lubricated with water-soluble mineral oils or black sulphurized oils.

Beryllium copper cavities are assembled by means of both gas and electric welding processes at average temperatures of about 1460° F., after which the assemblies may be reannealed if maximum strength is to be attained in a concluding age-hardening treatment — which consists of heating to about 600° F. for three hours in an electric box-type furnace, followed by cooling in still air.

If necessary, cavities can be electroplated after the final heat treatment with metals such as chromium, cadmium, silver, zinc, etc. Average plating depth is about .0004".

Fir Plywood Output Sets All-Time Record

THE West Coast fir plywood industry, now numbering 45 separate plants and stretching from the Canadian border down deep into northern California, is hanging up an all-time production record of 1,900,000,000 square feet in 1948.

In the year ahead, planned output is for another new high of perhaps 2,200,000,000 square feet. A half dozen new plants have come into production in the past 12 months, others are now under construction.

Panel makers, who stress that Douglas fir plywood today is a basic commodity for

industry and construction, point to the 60 per cent increase since the last war year as a production achievement. But, they explain, 1948 volume is only about a quarter greater than in 1941.

Two additional developments in plywood highlight the year:

1. For the first time in eight years, Douglas fir plywood at year's end was in relatively good supply.

2. Manufacturers, tailoring their product more closely than ever to customer needs, have introduced additional grades and offer the panels in several stock sizes.

According to Arnold Koutonen, president of Douglas Fir Plywood Association, plywood demand will remain huge as compared to previous standards so long as

business activity and building, both heavy and light, continues on the plateau forecast. About 40 per cent of plywood goes to industry; housing and heavy construction (plywood for concrete forms) are both important.

Introduction of the new intermediate appearance grades of plywood is the result of general use of an automatic machine for repairing such natural wood defects and knots.

Of dual purpose—for efficient use of the panels and for maximum utilization of raw materials—plywood makers now are producing several stock sizes of panels. The 4 x 8-foot sheet will be the biggest volume item but panels both smaller and larger as well are standard items.

LABOR

and the
INDUSTRIAL WEST

Unvarnished Facts About the Oil and Marine Strikes

WHAT may well be remembered as the "Roth-Murray plan," designed to establish a formula to bring and keep peace in the future on the Pacific Coast waterfront, embodies a principle which logically can be extended back behind the piers into industry and business where these units have contracts with the ILWU.

The principle on which this agreement was based has been practiced for many years between the AFL and the San Francisco Employers Council in cases where disputes, likely to disrupt the public security seriously, have reached a stage where some one or a small committee, representing the unions and management, but not parties directly to the dispute, can be used to change the serious threat of a strike into a settlement.

As the agreement can be used anywhere, if the right people can be brought together and given the problem to handle, the wording of the Roth-Murray plan is important.

The first sets out the intent; the second, numbered 1, states: "All disputes between members of the Employers Council (the Waterfront Employers are members) and the ILWU shall be settled, wherever possible, through the process of collective bargaining."

Paragraph No. 2 follows: "The San Francisco Employers Council will not give its support to any employer association or individual member unless such association or employer has given due notice to the council of action on its part which may result in a strike or lockout, and unless such association or employer has applied to and obtained from the Employers Council approval of its contemplated action."

Paragraph No. 3 states: "The National CIO agrees that it will not give its support to the ILWU unless the ILWU previously has given due notice to the National CIO of its intention to strike and unless it has applied to and obtained from the National CIO approval of its contemplated action."

Paragraph No. 4 states: "Upon receipt of notice and application from WEA for support and approval of any contemplated

By 'Western Industry's' Labor Reporter

The accompanying articles on the "Roth-Murray" plan, and the maritime and oil strikes, are careful and impartial surveys of these situations from first-hand sources, intended to present the most significant angles.

action which may result in a strike or lockout, the San Francisco Employers Council shall then call upon the ILWU to enlist the services of the National CIO to conciliate the dispute through meetings between the National CIO and the San Francisco Employers Council; and the National CIO will follow a similar procedure upon receipt by it of an application from the ILWU for support and approval."

Paragraph No. 5 states: "This agreement does not replace the grievance or arbitration machinery of the contract for the adjustment of grievances and disputes which arise during the life of the contract, and this agreement shall not in any way render ineffective the operation and administration of the contract by the signatory parties."

When the maritime strike was around 30 days old, Mr. Roth, because of the positive positions taken by both parties, became convinced the employers and the unions involved might never settle their differences. He then proposed locally that the National CIO be brought into the pic-

ture to aid in negotiating a settlement and to underwrite union behavior in any agreement written between the disputants.

The idea being approved by the employers concerned, Mr. Roth went East to talk with the National CIO leaders, many of whom he knew and who knew him from his work with the National Labor Relations Board. He made a number of airplane trips to different parts of the East, selling his idea and finally was told to go ahead, but on condition that the union leadership in the strike invite the National CIO to come in and help.

He came home and went to work on the Pacific Coast unions involved in the strike. They, being under tremendous pressure from their own and other unions to stop the strike, finally consented to go along. And as a result, in the week-end of December 5, the 90-odd day strike of some 28,000 maritime workers came to an end, with the ILWU new agreement underwritten by the National CIO.

Speaking of the agreement, Mr. Roth said: "It works on a system of deterrents on actions by employers and local unions, which might otherwise result in strikes." He continued, "It will afford an opportunity for further voluntary conciliation efforts to avert strikes and lockouts. I am confident that if such a program . . . had been in effect, the present waterfront strike would not have occurred."

Long-Run Outcome May Offset Maritime Employers' Mistakes

THE outcome of the 95-day Pacific Coast maritime strike, if things go well, may be a win for the employers, due to the work of Almon Roth, president of the San Francisco Employers Council, in getting the National CIO to underwrite performance of the contracts with the trouble-making CIO unions.

No doubt exists in the mind of any competent observer that this year's longshore strike was a "must" with the leaders.

For some reason, not connected with hours, wages and working conditions, they had to have the strike. And the leader said it would last a long time, which it did.

Maybe it was a Communistic move, made in the world-wide checker board game the Kremlin plans and plays, perhaps one to aid the zealots in the Orient. But, whatever the reason, it was a big strike, some 28,000 people, which would throw out of work some three, four, six or more people

on the Coast and inland, for every maritime worker involved. But, it was still a strike, subject to the laws that govern such matters.

The deadline had been set by the Union as midnight September 1 (and this meant all the unions involved). When the Marine Cooks and Stewards Union, which is dominated by the left-wing leaders, brought in 12 pages of new demands during the day of September 1, it was obvious the strike was planned and would go through regardless. On the same day the employers offered everything they could to the longshore leader, but their proffers were of no avail. He'd see them on the picket line, he said.

Shipowners Could Have Won

Under these circumstances the employers could have placed a natural, simple and hard-to-beat case for themselves before the public. All they had to do was to keep on telling the public what the leader of the longshore unions and his stooge union of cooks did that last night; what the longshoremen and the others involved had been earning; the probable losses to the community, by the day, week and month; the harm done to the Marshall Plan; the probable over-all losses in foreign trade, because every one of these many maritime strikes on the West Coast has taken some business away permanently from this territory.

That, it would seem in retrospect, was the way for the employers to have won this strike and it might have been done in 30 days.

Bridges was on a rough spot. He had no excuse for the strike. He knew this and so did his close supporters. He knew it was only a question of time, and not much time as strikes go, until pressure from the group of unions he led and from the other outside affected unions, would force him to send his people back to work.

Evidently, the employers did not know they had an extraordinary advantage, or they followed their own ideas of how to fight the issue. Had they said, "We have come to the conclusion that dealing with this group is a waste of time; they are on strike now; we'll continue our last offers for 15 days, and if they are not acceptable probably we will then withdraw them"; had they said this and let the matter rest there, people who are competent to figure matters of this kind believe Harry Bridges would have been back before the end of 15 days negotiating a peace.

But these employers had behind them 14 years of disruption. Their report shows 1,399 work stoppages in this 14 years, and in addition the loss of more than a year's time in working days in the same period through major strikes. All that before this 95-day strike started. From all appearances they were angry. So, they decided the moment was favorable to blast the union leaders out of the picture.

The strike started at midnight September 1. On September 4 the employers announced they had withdrawn all offers formerly made to the unions and said they would not bargain or contract with any labor organization unless non-Communist affidavits were filed by said unions with the National Labor Relations Board.

Harry Bridges grabbed this manna from heaven, referred it to the rank and file, who promptly voted confidence in their officers and told them not to sign the affidavits. Backed by his own union on this vote, as he might not have been on the employers' last proposals if given to the membership without any strings, his position was greatly improved and he could hang on and wait the next move of the employers.

Had the employers held their fire for two or three weeks on the non-Communist affidavits, the Union leadership would have had to go to the Unions with the employers' last offer, or else neglect to do so. In either case, the burden would

be upon the leaders. They would be hounded by the press and under pressure from their own members and other union people to do something about the strike.

Then there is another highly important angle which ties in here. Saying publicly you won't deal with any union until they get rid of their elected officers—no matter what the reason—puts you in opposition to the entire membership of the AFL and the 90-odd per cent of the CIO who hang to the principle (and it is a good one) that it's nobody's business whom they elect to do business for them.

Maybe, some observers friendly to the efforts of the Waterfront Employers believe, the refusal to bargain and the withdrawal of all offers was the direct result of the methods used by the union leaders during the negotiation. These people practice irritation and more irritation. They poured all sorts of irritation at the employers in these sessions. Perhaps it was with the idea of having them do just what they did, and so give them an angle on which to maintain their leadership.

Public Relations Wins For Oil People, But at Some Cost

ALTHOUGH the California oil workers strike began to break up when parts of crews went back to work and will go down as a loss to the union now, it may be later on even a greater loss to the employers.

Largely, in the nature of things as they occurred, this strike was a union mistake. Some think the leaders were willing, even eager, to have the crews go out. So run reports from those close to the union leaders who led the strike.

The companies, previously most generous with wage increases and without strike, are reported not to have been worried during the negotiations about the idea of a strike as advanced by the union negotiators. Maybe they thought the union was bluffing. Again, perhaps they figured if a strike was what the union wanted this would be a good time to have it.

Public opinion, more than anything else, lost the oil workers strike. The oil industry organized a committee to handle public relations and this group did an excellent job, one that any employer faced with, or in, a strike could well afford to follow.

This committee told the public, in press stories, and in large newspaper advertising, the industry was:

- (1) Sorry that motorists might not be able to get all the gasoline they wanted;
- (2) But they would do everything possible to care for essential public services.
- (3) That they could not undertake with the high wages already paid by their industry, to be responsible to the public of the Pacific Coast for starting another round of wage increases.

Then they demonstrated the wage offer to the unions of 12½ cents was fair. They pointed out the cost of living had gone up 72 per cent since 1941, but that with this 12½ cents added to the present scales, the worker in the oil industry of California would be receiving 83 per cent over his 1941 wages. And they finished their usual advertisement by expressing willingness at any time to go back into negotiations.

Essentially, that was their public relations campaign. They were mad at no one; sorry for the public, should it suffer, but not blaming the union either in the press or on the radio. This was smart psychology. Every advertisement held the 12½ cents out, together with the wages already being paid, to their workers and for the employees of other concerns up and down the Coast to see.

Explanation of wage rates and earnings and the lack of abuse of any kind directed to the unions, convinced the public the union did not have a good case. So, the union lost the sympathy of other unionists, an important consideration, when it already had trouble from other unions, with contracts to perform in these same struck plants.

The Oil Workers intended, so they said, not to interfere with these other unions. But however good their intentions, somebody did interfere and little wars were started here and there, which did the striking union's case no good, and apparently aided the employer case. Whether the employers gained or not from the exchange of brick-bats, cars overturned, slugs of metal thrown with intent to inflict harm,

threats to persons and damage to property, will be determined maybe a long time from now. At the moment, one can only analyze and make the best guess possible.

There is evidence, from the reports of many people close to the conflict, that what would seem to be an extraordinary loss of loyalty and friendliness toward some of the companies has piled up in the hearts of many of their former good employees. These people blame the companies, who as far as we could tell, played the game as they honestly believed it should have been played. But then, so did the unions in their own opinion. So, what does it add up to?

Human feelings are the most difficult things folks have to deal with, both their own and those of others. One slip of the tongue in a negotiation by a union man may set the employer for a long strike, where without that error he might have been willing to compromise. His feelings were hurt and he'll fight hell out of them.

The union says the companies did not take the negotiations seriously, not believing they would strike, or if they did that it would not last long.

The union says it is conservative and never tried to crowd the oil companies too far. And they claim a lot of things that happened during the strike started with the employers.

Now, if this view is held by many of the 15,000 people who go to make up that union in California, and there is occasion to believe, from the reports of people who should be neutral, that it is, the companies maybe have won the strike but maybe also have lost a whole lot more than it cost in employee loyalty and confidence.

No doubt the several oil companies want at all times to be fair, even more than fair, to their employees. Their record in excellent personnel work proves it. But, one is reminded of the indulgent father, who after years of coddling his growing family suddenly decided he was in error and he would not give in to them any more. He would let them make their own mistakes and so grow up the rest of the way so they could handle themselves without his help in the battle of life. Almost overnight father became the children's Public Enemy No. 1.

Now that it is all over, some impartial observers believe it would have been wise for the oil companies to have accepted the strike, closed down and let the public, including the other directly interested union people, clear up the strike. No devils would have been made of old-time friends that way, they said, and it would not take many, many years to build back the quantity of employee loyalty quite evidently lost in the strike.

Conciliation Service

The State Conciliation Service during October serviced 58 disputes, including the oil workers strikes, compared with 70 in September and 78 in August.



• A veteran sawyer changes the head saw (a 50-ft. loop) in Snoqualmie Falls sawmill.

Two Answers in Kennecott Case

When is a locomotive engineer a railroad man and when is he a production worker? Because there are two answers to this question the Kennecott Copper Corporation's big mine in Bingham Canyon, Utah, supplying around 30 per cent of the country's copper ore, is closed.

Two rail lines are operated by the company. One brings the ore up out of Bingham Canyon. The other moves the cars of ore from the top of the hill to the mills and crushing plants in Magna and Arthur, Utah. Crews on both roads are members of the Brotherhood of Locomotive Firemen and Enginemen.

In October the Brotherhood demanded the same scale on both lines, the company having paid previously the mine scale for the Canyon road and the standard railroad wages for the short haul to the mills and crushing plants.

Upon negotiation the demand of the Brotherhood was scaled down from \$4.80 more per day to \$2.71. The company of-

fered 12c an hour, the amount recently accepted by the mill and mine employees. Late in October the Brotherhood struck.

The company is following the customary practice in American industries where in-plant railroad men who do not operate at all on main lines are paid rates in line with their duties and responsibilities.

Work Stoppages Show Decline

Work stoppages for the first half of 1948 in California totaled 92, involving 48,206 workers, compared with 136 work stoppages with 82,243 workers idled during the corresponding period of 1947. The number of man days lost as a result of work stoppages dropped to 691,435 the first six months of 1948 from 1,872,963 in the same period of 1947. These figures were compiled by the U. S. Bureau of Labor Statistics in cooperation with the California Division of Labor Statistics and Research.

From the Industrial Associations

Lumbermen's Industrial Relations Committee, Inc., Portland and Seattle

Differentials Shrink

Wage differential narrows between skilled and unskilled workers because of generally larger supply of skilled workers, competition among employers for unskilled workers, increased mechanization, and more important, union policy in wage demands for a cents-per-hour settlement. Prior to World War I skilled workers received on an average 105 per cent more than the unskilled; this differential dropped to 80 per cent in the thirties, then to 65 per cent just prior to World War II. Last year it averaged 45 per cent, except in the South, where unskilled labor is to be had and where the average is 70 per cent. Because of these factors the Bureau of Labor Standards estimates the differential is shrinking at a rate of 1 per cent per year.

Notification Form

The Federal Mediation and Conciliation Service has announced a form that may be used in complying with Section 8(d) of the Labor Management Relations Act, which requires the party who has given the prior 60-day notice to terminate or modify the present agreement and also to notify the FMCS and the appropriate state of territorial conciliation agency within 30 days. Copies may be had from any FMCS office.

Work and Wages

Washington state non-agricultural employment was higher in September, 1948, by 14,000 than 1947; 703,150 in 1948, and 689,150 in 1947. This increased employment was accompanied by an average statewide wage increase of 8 cents during the first eight months of the year; \$1.532 per hour in January and \$1.611 in August. Douglas fir average hourly earnings for January were \$1.844 for logging and \$1.569 for mills. For August the figures were \$2.032 for logging and \$1.682 for sawmills. Also accompanying the increased employment and wages was longer work weeks.

* * *

*Industrial Conference Board,
Tacoma, Wash.*

New Wage Order

A tripartite panel on November 22 agreed in Seattle upon terms of a new minimum wage order to be issued by the Industrial Welfare Committee affecting female and minor office workers. The wage was set at 65c per hour, taking the place of an hourly wage of 37½c ordered in 1941. Hours of labor under the order are as at present.

The employers' interest was handled by the Washington Minimum Wage Confer-

ence. The chairman is M. J. Muckey, manager of the Industrial Conference Board; secretary is Robert Hayes of the Association of Washington Industries. C. W. Hunlock of Western Hotels, Inc., is chairman of the finance committee. The case was conducted by R. J. Venables, assisted by W. L. Lubersky, both Seattle attorneys.

Settlements Vary

Pacific Northwest wage settlements, since our last Bulletin, indicate a wide divergence in ability to pay. Venetian blind manufacturers in the Seattle area renewed their contract without any wage change. The industry is not in a favorable position. Tacoma Powdered Metals granted a wage increase of 17½c; Tacoma Office Buildings, 10c; Tacoma Stores, alterations departments, 8½c; men's stores, 10c with Garment Workers bushelmen; Bellingham and Olympia stores followed the Seattle pattern for clerks, 6½c for women and 7½c for men.

Negotiations have begun in the mill-work industry, Seattle-Tacoma area. Logging operators in the Mineral-Morton area have opened vacation agreements. Teamster warehousemen, Seattle-Tacoma area, are asking for a health, accident and life insurance plan with hospital and surgical benefits, the employer to pay for at an estimated cost of \$8.50 per month. This is in addition to a wage increase.

Tax Reduced

Nearly 26,000 employers in Washington will save almost \$9.4 million in unemployment compensation taxes during 1948-49 credit year beginning July 1, 1948. This saving in the form of tax credits represents more than 28 per cent of the almost \$33,000,000 paid in contributions on 1947 payrolls and results from the merit rating formula established by the last legislature.

* * *

*Merchants and Manufacturers Association,
Los Angeles*

Southland Picture

Employment is reported at an all-time high. Average weekly income of workers in manufacturing shows consistent increases. Strikes are counted as low. From 134 strikes in 1946 to 77 for 1947 looked good, but this year to date the total has been 43, all in Los Angeles.

Sixty per cent of the record attendance at the Merchants and Manufacturers Association's Sixth Annual Employee Relations Conference at Palm Springs were presidents and vice-presidents of Los Angeles companies. This, we believe, is evidence of greater interest in improving industrial relationships.

Communist-dominated unions steadily lost during the past year to unions qualified under the Taft-Hartley Act.

Sunset Line and Twine Company

The precedent-smashing decision handed down by the National Labor Relations Board late in October in the case of the International Longshoremen's and Warehousemen's Union, San Francisco and Petaluma and the Sunset Line and Twine Company, headquarters at San Francisco and plant involved at Petaluma ranks among the most important in several years, according to the Labor Relations Reporter.

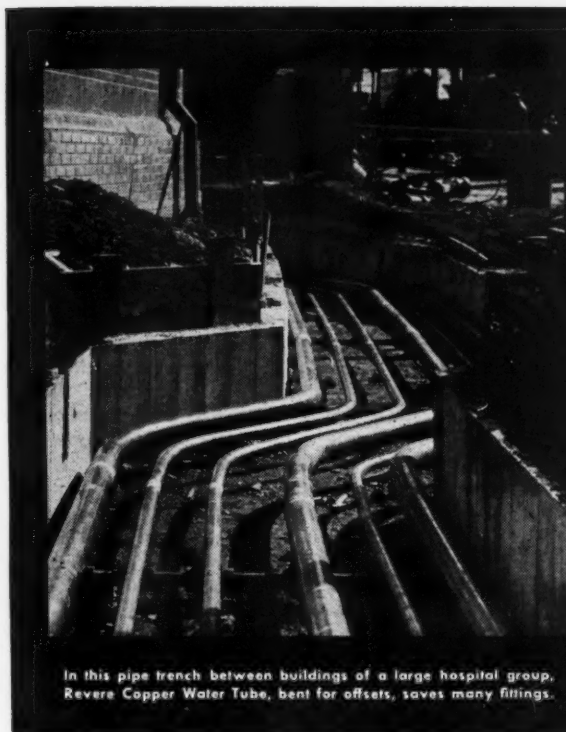
In the negotiations and in the board action the company was represented by the California Association of Employers, San Francisco. Here are some of the highlights of the decision:

1. Coercing employees in their right to stay out of a strike is illegal.
 2. Coercion includes such things as trailing a greatly outnumbered group of strikebreakers through the streets, threats of bodily harm to strikebreakers, and instigating violence on a mass picket line even though many of those on the line were part of the general public.
 3. Name calling, including hurling the appellation of "scab" is *not* coercion or restraint.
 4. Standing in the way of automobiles to prevent their entering a plant is unlawful as "restraint."
 5. Unions will be held to the same rules as employers in the matter of responsibility for their agents' conduct.
 6. Union representatives who direct strikes and picketing for a union render the union responsible for all their unlawful conduct.
 7. If an international union associates itself with the local union in support of a strike and picketing, it also is responsible for the acts of the local's agents.
- Paul M. Herzog, chairman, and John M. Houston, member, dissented in part, but signed the decision. They pointed out in the first paragraph of a several thousand word dissent:
- "But we find it impossible to concur in holding, on *this* record, that the International was responsible for the acts of restraint and coercion committed by various individuals during the strike."

Metal Trades More Peaceful

Fewer strikes hampered the metal-working industries of southern California in 1948 than in previous years. Less time was lost in labor disputes, perhaps in part because of the Taft-Hartley Act, partly because of improved labor-management relations.

Although there is talk of a fourth round of wage increases, other indications of lowered costs of living offer the possibility that there may not be the necessity for another round. Labor may even be hurting itself by pushing for increases at a time when the inflationary spiral may be starting to unwind.



In this pipe trench between buildings of a large hospital group, Revere Copper Water Tube, bent for offsets, saves many fittings.



Hot and cold water lines of Revere Copper Water Tube joined with compression fittings. Note the smooth bends in this hard temper tube.

TROUBLE always costs more than **REVERE COPPER WATER TUBE**

THE permanently smooth interior of Revere Copper Water Tube permits full and unrestricted flow of water, oil or gas for a lifetime of continuous service. Due to the long life of copper, this tube guards against leaks, rusty tap water, inadequate flow and faulty circulation. Yet, completely installed, it costs little or no more in the first place . . . and much less in the long run. Remember—*trouble always costs more than Revere Copper Water Tube!*

Revere Copper Water Tube is ideal for heating, water supply, air conditioning and other services—underground or indoors—in all kinds and sizes of buildings. Joints are easily made with either soldered or compression fittings. The soft temper Type K and Type L tubes in all sizes, and even the hard temper Type K tube in sizes up to 1" inclusive, are easy to bend, thus eliminating many fittings and reducing frictional resistance in the piping system.

Revere Copper Water Tube is stamped at regular intervals with the Revere name and the type. Look for these identification marks—they insure full wall thick-

ness and the close gauge tolerances so essential for tight sweated joints.

You can specify or install, in addition to Revere Copper Water Tube, such other long-lived Revere materials as Red-Brass Pipe; Sheet Copper and Sheet Herculoy for tanks, ducts, pans and trays; Dryseal Copper Refrigeration Tube (dehydrated and sealed); Copper oil burner, heat control and capillary tubes.

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Eight Simple Rules Offered For Storage Battery Care

By K. A. VAUGHAN

Manager Field Engineering
Gould Storage Battery Corporation

THE storage battery is the heart of the electric industrial-truck. Its care and maintenance, though simple, is of utmost importance if maximum battery life and most efficient truck operations are to be realized.

In the following article eight simple rules of battery maintenance recommended for lead acid batteries used in electric trucks are discussed. These rules apply whether the plant has but one truck or a diversified fleet of a hundred or more. They will help the supervisor of the well planned veteran shop as well as the owner of a new truck system.

Before stating and discussing the eight recommended rules, it will be well to make the point that one, or more, persons engaged in truck maintenance, should be well versed in battery technology. Battery maintenance should be under his direct charge and no unauthorized employee should be allowed to service batteries.

From time to time the larger battery manufacturers conduct training courses in battery care and maintenance for employees of industrial organizations.

General Rules

The eight general rules that will keep most batteries operating at maximum efficiency are:

1. Purchase correct capacity batteries.
2. Keep batteries clean.
3. Add water at regular intervals.
4. Charge correctly.
5. Make periodic inspections.
6. Keep accurate records of all activities.
7. Keep the battery charged when not in use.
8. Repair when necessary.

Correct Capacity Batteries

It is obvious that by purchasing an oversized battery, money is wasted on excess capacity which is not needed. It is equally false economy to purchase a battery which is too small for the job. Too small a battery results in repeated overdischarging, which in turn results in decreased battery life.

In estimating battery capacity requirements, the ampere hour or kilowatt capacity required for each shift should be considered as 80 per cent of actual battery requirements. Battery or truck manufacturers' representatives are available to determine more closely actual requirements.

While on the subject of overdischarging,

two additional causes should be mentioned. They are: (1) an insufficient supply of batteries and (2) inadequate charging equipment.

As a guide against having an insufficient number of batteries, 2.1 batteries per truck can be used as a minimum for three-shift operations, provided available charging equipment can recharge each battery in eight hours.

To prevent overdischarging, two methods are commonly employed:

(1) A discharge indicator which records battery voltage is mounted on the truck

body so the operator can tell at a glance what the condition of his battery is. The indicator is calibrated fully charged, half charged, quarter charged, and discharged. It can be mounted on any type of vehicle and is adjustable for 6-12-24-30-32-36 and 48 volts.

(2) Periodic checks can be made of the specific gravity of the battery during duty cycles. Some users establish a schedule whereby equipment is returned to the battery charging room every four hours for a specific gravity check and if the specific gravity is 1,200 or lower the battery is removed from the vehicle and charged. If the specific gravity is above 1,200 the battery is continued in service for another four hours.

Under this system batteries usually receive one heavy discharge and one light discharge every two days. This has proven to be most successful in keeping equipment in operation and reducing battery costs by extending the battery life.

Cleaning

The object of cleaning is to prevent stray current leakage across the top of the battery and grounds to the truck body. The frequency of cleaning will depend upon the conditions under which the batteries operate and upon the surrounding local atmosphere. Cleaning schedules vary from once a day to once in several months. However often cleaning is required, a routine schedule should be followed.

The first step in cleaning is to be absolutely sure that all the vent plugs are in place and tight. Water or air is then usually applied from a hose to accomplish the actual cleaning. When water is used, the battery should be wiped dry to prevent possibilities of current leakage. Concentrated sodium bicarbonate solutions are also used in cleaning operations. In this case a spray gun or commercial paint sprayer is used.

Terminals and connectors may be cleaned with a concentrated solution of soda ash and water. They should never be scraped, for scraping might damage the lead plating of the copper connectors and so expose the copper to the corrosive action of the acid. In the cleaning process, the soda of the solution neutralizes the acid. Therefore, washing should be continued so long as there is evidence of the presence



• (Top) Add water at regular intervals. Once every one or two weeks is sufficient for full cycle operations. Use distilled or manufacturer-approved water. (Bottom) Make periodic inspections. The specific gravity of the battery should be checked at least once every three months; but preferably once each month.

After metal surfaces are thoroughly neutralized, they should be dried and a thin coating of battery grease or vaseline applied to prevent the acid coming in contact with the copper.

The level of the electrolyte in the cell is to be maintained between low level and high level points. Minimum low level point should be above the splash cover. Maximum high level point is just under the bottom of the vent-well in the cover. Addition of an excess quantity of water, with the idea of prolonging the period between regular water additions, results only in excess overflowing during charging, thus causing loss of electrolyte and a dirty battery.

It is normal for the electrolyte level in a battery to decrease very rapidly with use. This decrease is caused by the evaporation of water from the electrolyte. The rapidity of decrease will depend upon how much the battery is used and upon how much charge it receives over and above what it requires. Normally, a battery does not require water more often than once in one or two weeks when it is in full cycle service. If it requires water more often, consult your battery representative.

Only water that is known to be suitable for storage batteries should be used. The water should be pure and free from any contamination. Generally, distilled water or condensate water is suitable. All the larger battery companies will analyze water samples for suitability as battery water at no charge to the user. Water should be submitted in clean containers of glass, plastic or porcelain with cork, glass or rubber stoppers.

It is important that batteries be charged correctly. Improper charging is one of the most prevalent avoidable abuses to storage batteries. The subject is quite broad and one which requires an article in itself for complete coverage. Suffice it here to advise



• **Keep the battery clean.** Frequency of the cleaning depends upon the conditions under which the batteries operate and varies from once each day to once in several months. Dry water-washed batteries after washing.

strict adherence to instructions of truck, battery, and charging-equipment manufacturers.

The specific gravity and voltage of each cell should be checked and recorded at least once every three months, but preferably once a month. This inspection should be made after an equalizing charge. (An equalizing charge is an extra three or four hour charge at a low rate given periodically after a normal charge to make sure all cells are in a fully charged condition.)

The following are five reasons accounting for specific gravity and voltage deviations between various cells:

1. Spillage of electrolyte, replaced by water.
2. Acid erroneously added to increase specific gravity of cell instead of properly charging it.
3. Loss of electrolyte in pilot cell due to hydrometer readings; replaced by water.
4. Broken jars leaking acid.
5. Shunt within cell.

The records of cell inspections should be filed so that the present state of the entire

battery can be compared with its condition at the previous inspection. In addition, records of all other maintenance activities should be made and filed to form a case history of the battery.

This is an important part of maintenance, since it enables the engineer to note which batteries are being abused or are wearing out and thus steps can be taken to correct abuses or replace units in time to prevent production stoppages. From these records, troubles in operating equipment, charging equipment, and charging schedules often can be diagnosed. Also, the men in direct contact with battery maintenance are more conscientious if they are required to record such data as: date of each charge; time, amps., and sp. gr. at beginning and end of charge; addition of water, etc.

During long periods of inactivity, the batteries should be fully charged, checked monthly, and a freshening charge given to those batteries that do not remain fully charged.

Repairs should be made as soon as it is known that they are required. Batteries which have either broken covers or broken jars should not be continued in operation.

After a cell is repaired, it should be given a charge to make up for that loss which occurred when the element was exposed; after the cell is fully charged the specific gravity should be adjusted to the correct normal value.

It is sometimes advisable to have spare cells, so that the spare cell may be installed in the battery while another cell is being repaired. This makes it possible to give the repaired cell a complete charge and adjust the acid to the correct value before the cell is placed back in service. If the cell was fully charged it should be placed in the battery after the battery has been recharged.

Adherence to these rules is a simple procedure, but one which will result in a longer battery life, better battery service, and more efficient truck performance.

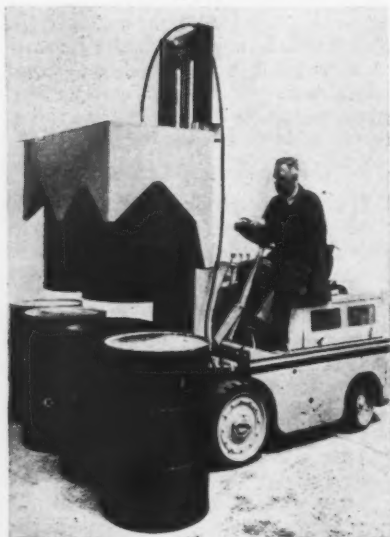
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NEW METHODS, MATERIALS, EQUIPMENT

That Will Help to Cut Your Production Costs

854-M



New Drum Carrier Attaches To Clark Fork Trucks

The new multiple-drum carrier for use with Clark Fork Trucks fits over the tops of drums, lifts and moves as many as four without need for a pallet. The unit, originally developed to fill the needs of a leading oil company, is easily interchangeable with standard forks. It is manufactured by Traynor-Reinhart, Oakland, Calif.

855-M

New Plate-type Fasteners For Heavy Conveyor Belts

Armstrong-Bray and Company, Chicago, who are manufacturers of conveyor belt products, now are producing a new line of fasteners for heavy duty conveyor belts. The Plategrip fasteners, made of heavy gauge steel, can be applied anywhere, and will withstand any load the belt can safely carry. They are available for belts from 1/4 to 1 1/2-inch thickness, and come packaged 10 to a box.

856-M

Now Operator Can Ride While Using Power Sweeper

Wilshire Power Sweeper Company of Los Angeles, California, have added something new to their line of power sweepers—a "Sulky" towing-dollie which easily attaches to their power sweeper, towing the operator along in its wake. The Sulky's small turning radius—only 90 to 125 inches—is an important feature of it, as one of the advantages of the power

sweeper is the fact that it sweeps to within one inch of walls or machinery.

857-M

New Relay Is Time Delay Type

A new proportional time delay relay is now being offered by Agastat Division, American Gas Accumulator Company, Elizabeth, New Jersey. It provides an initial time delay of one minute; the time delay starts when the coil is energized; once its timing cycle is complete, should a power failure occur, the relay immediately switches off. Restoration of power within one to 15 second instantaneously re-establishes the circuit. A combination of two of this type of relay and one of the company's standard type relays makes possible a proportional time delay up to five or more minutes. The manufacturers claim the new relay is proving invaluable for use in radio and television transmitters.

858-M

High-speed Repair On Concrete Floors

Tampatch is the name of a new invention of United Laboratories, Inc., Cleveland, Ohio, producers of building maintenance equipment. The new product is a fast-drying floor patch to fix up broken, rough or uneven concrete surfaces; it comes in a ready-mixed form, ready for use. One of the outstanding claims for this new product is its ability to withstand heavy loads, and the fact that the floor may be placed in service almost immediately after the necessary repairs have been made, with traffic over the area soon smoothing out the repaired section by compressing action.

859-M

Stainless Steel Tub-Type Truck

This truck, made by the Market Forge Company of Everett, Mass., was especially planned by the company for use in paper mills, meat packing plants, food processing plants, etc., where sanitary units can be readily cleaned if necessary. The model shown has a capacity of 1,000 pounds, and is also available in hot dip-galvanized.



For Your Convenience . . .

Use this postage-paid card to obtain further information on products mentioned on these two pages and on literature listed on the following page . . .

860-M

Self-Winding Reel Suspends Tools Overhead

The Zoo "Self-Wind" Balance Reel is hung from a beam or a cable in work position above the assembly line, with the power tool fastened to the end of a six-foot cable wound on a drum within the housing. The operator simply pulls the tool down for use when he needs it, raises it out of the way when he has finished the job. It is put out by Aero-Motive Manufacturing Co., Kalamazoo, Michigan.



861-M

Nitric Acid In Steel Drums

Stauffer Chemical Company, San Francisco, now are putting out all grades of their nitric acid in a new lightweight stainless steel drum. The new container holds 8 1/2 gallons or 90 pounds of acid, yet weighs but 20 pounds, is non-shatterable and has a 1 1/2-inch pouring spout at the side of the top for easy pouring. The manufacturers claim that the new lighter package should save on freight costs, as well as being easier to handle.

862-M

Lightweight Aluminum Scaffold

Up-Right Scaffolds, Berkeley, Calif., have come up with a scaffolding made of a lightweight aluminum alloy which locks together as it is erected, eliminating wing nuts, bolts, loose parts and the use of wrenches. A 7-foot, single section is supposed to take one man just a minute to erect, and a 45-foot multiple unit, only 15 minutes. The scaffolds are available in any number of section units.

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Also further information on the following products advertised in this issue:

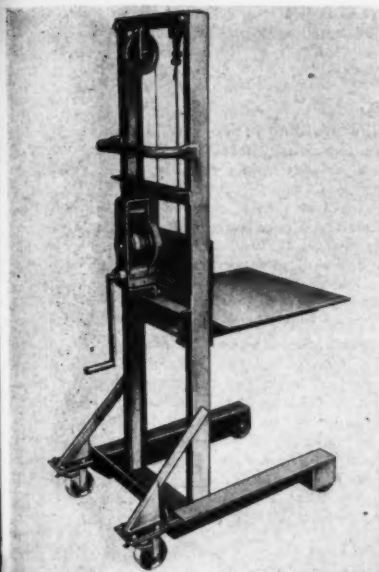
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863-M



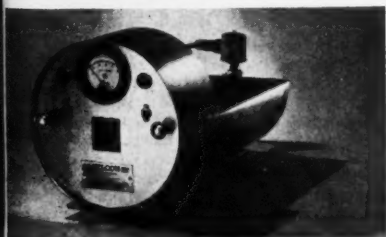
Portable Elevator Of Many Uses

Operated by one man, the new Barrett Portable Elevator is adaptable to numerous and varied tasks which include loading and unloading motor trucks, piling cases, barrels or bales, raising loads to platforms and ceiling and lineshaft repairs. It has a capacity of 500 pounds, a lifting height of five feet and a platform 24 inches square. It is made by Barrett Cravens Co., Chicago, Illinois.

864-M

Control Maintains Wash Solution Strength

Correct wash solution strength for clean dishes and milk cans in mechanical dishwashers and milk can washers is automatically maintained by the Selcon Electronics Solution Control, which feeds washing compound into the washer as needed to recharge the solution when weakened by soil and rinse water. It is 10 inches wide by 23 inches long by 11 inches high, weighs 20 lbs., and has an indicator on the control panel which provides a constant visual check on the condition of the solution and the operation of the control. It is made by the Selcon Engineering and Chemical Company, St. Paul, Minn.



865-M

'Hep-Mits' Come in Bright Colors

When the Riegel Textile Corporation, New York, started making their heavy knit jersey gloves in brilliant colors, they intended them to be used for gardening, but industrial users are now buying the gloves as well — some plants are trying them for identification purposes between various divisions and job classifications, just as the Navy uses colored sweaters for quick identification on carrier decks. The gloves come in red, green, gold, orange, yellow, purple, blue, maroon, gray, black, and white.

866-M

Vise Simplifies Dissection of Chain

The forged steel jaws of the new Baldwin-Rex chain vises securely hold the chain which is to be taken apart, while properly applied blows with an ordinary drift will quickly remove the pin — each vise has the jaws so shaped that the pin link to be removed has a firm seating on the edges of the jaws. Vise No. 1 handles single width roller chains from 1/2 to 1-inch pitch and Vise No. 2, single width chains from 1-inch to 2-inch pitch. They are made by Chain Belt Company, Milwaukee, Wis.

867-M

Overhead Conveyor Wheel Made Drip-proof

The lubricant in the overhead trolley wheel bearing designed by Jervis B. Webb Co., Detroit, Mich., does not drip under any operating conditions, the manufactur-



ers claim, because of a special double labyrinth seal and an adequate lubricant cavity, which feature makes it especially useful in locations which should not be contaminated by grease, like ovens, washing machines and degreasers.

868-M

Diaphragm of Chemical Gage Made of Teflon

When Teflon is used to make the diaphragm of a chemical gage, as it is on this one put out by the Helicoid Gage Division, American Chain & Cable Company, Inc., Bridgeport, Conn., it means that the gage is made resistant to corrosion, and is therefore particularly suitable for chemicals and other viscous liquids which might clog the Bourdon tube of a standard pressure gage. This gage measures pressures as high as 1,600 psi. and temperatures to 300° F.

869-M



Plastic Hood Gives Protection to Painters

The Airline Hood now available for paint sprayers is fitted with an efficient air filter, which keeps a constant flow of fresh air circulating inside the hood and passing out through the hood's eye-openings, preventing particles and paint fumes from entering. It is made by the Sharpe Manufacturing Company, Los Angeles, Calif., of a special transparent light weight plastic.

870-M

New Scale Weighs As It Conveys

Cranes and hoists can now be weighed on the "Hydroscale," a new scale put out by Hydroway Scales, Inc., Detroit, Mich., which works on the static pressure principle — it automatically weighs as the load is lifted, which makes accurate weighing a routine matter in innumerable applications, where it had been thought impractical before. It is believed that the "Hydroscale" in this and other models will eliminate much conveying in conjunction with weighing in shipping and receiving departments, foundries, tool and die shops, heat treat plants and in checking weights for inventory.

871-M

Corrugated Metal Cut With Portable Shears

The new portable Universal Metal Shears, made by Universal Products Co., San Francisco, Calif., cuts corrugated metals cleanly, without damaging the corrugations; cuts can be made crosswise, lengthwise or diagonally. The shear can also be used to cut corrugated asbestos, as well as metal lath and sheet metal. It weighs 15 pounds and may be easily moved about the job, claim the manufacturers, or from job to job.

HELPFUL LITERATURE

For the plant operator
who wants to keep informed

2480-L

Furniture and Toy Makers and other plants that use a wood boring machine will be interested in a four-page data and specification sheet on a hand-feed radial borer which has just been designed by B. M. Root Company, York, Pa.

2481-L

Chlorine Technical Manual Announced—A new technical manual, "Chlorine," has just been released by the Pittsburgh Plate Glass Company, Pittsburgh, Pa. It is the second of a series of technical data books the company is issuing, and contains full information for technicians and executives on chlorine's production, handling, safety precautions, and properties in a 72-page attractive black and green format.

2482-L

Chip Screens Described—Two types of chip screens which Allis Chalmers, Milwaukee, Wis., builds for the pulp and paper industry, with dimensions, construction and special engineering features of the screens, are described in their new eight-page bulletin, "Allis-Chalmers Chip Screens for the Pulp and Paper Industry."

2483-L

Towmotor Job Study No. 78—This job study, which gives details of how The Imperial Sugar Company of Texas solved an unusual combination transportation, storage and handling problem through methods involving the use of fork trucks, has been made available by Towmotor Corporation, Cleveland, Ohio.

2484-L

Rivet Booklet—An illustrated eight-page folder in color has been issued by Vic Pastushin Industries, Inc., Los Angeles, Calif., on the use of their "Fluid-Tight" Jacketed Rivets and "Head-Sealing" Washered Rivets in aircraft assemblies; they were developed in response to the demand for leak-proof rivets for various aircraft parts, and can be installed with ordinary aircraft riveting techniques.

2485-L

Chronicle of Oil Industry—"The Story of the National Supply Company" is a 48-page history of the company's development, and, since the company's business is oil field equipment and machinery, the booklet gives an interesting and informative picture of the founding, growth and operations of the petroleum industry. It is liberally illustrated with drawings and photographs. The National Supply Company, Pittsburgh, Pa.

2486-L

Free Chemical Charts—W. C. Hardesty Co., Inc., Los Angeles, Calif., offers three data sheets containing information vital to processors of chemical products using fatty acids and fatty acid by-products. The first lists fatty acid components of the most commonly used fats and oils; the second is a color standards comparator; the third is a temperature conversion table, giving conversions to both Fahrenheit and Centigrade from bases of —100 to 1100. All three charts are available in durable cover stock for posting in convenient plant locations.

2487-L

Prest-Glass Booklet—An unusual new building material, translucent or opaque, flexible and able to be cut with scissors, called Prest-Glass, is described in a little 10-page booklet put out by The Prest-Glass Corporation, New York, N. Y., which gives its uses, specifications and colors and consists largely of decorative photographs.

2488-L

Ring Packing Explained—A new sort of ring packing has been designed by Greene, Tweed & Co., North Wales, Pa., and is described by them in a 12-page illustrated bulletin. The packing, which is designed to eliminate the damaging effect of extrusion of packing material into the clearance space between the mating parts, was originally planned for aircraft use, but has now been applied to a wide range of different industries.

2489-L

British Technical Reports—A special list of recent scientific and technical publications of British government agencies has just been compiled by the Office of Technical Services, Department of Commerce, and is available to the public without charge. Items include, among other things, studies on use of aluminum and aluminum alloys for food machinery; flameproof testing methods; a description of the manufacture of hand-blown glassware; a handbook on vegetable dehydration.

2490-L

Steam Detergent Cleaning—"Industrial Steam Detergent Cleaning—Where and How to Use It," a new eight-page report issued by Oakite Products, Inc., New York, N. Y., describes the many types of industrial uses to which steam-detergent cleaning may be put. The booklet includes photographic laboratory reports, charts and tables.

2491-L

Escalator Conveyor Described—A new two-color bulletin issued by The Rapids-Standard Company, Inc., Grand Rapids, Mich., manufacturers of material handling equipment, describes how many firms unable to buy expensive power belt conveyors have filled their needs with the company's low-cost escalator-type belt conveyor—the bulletin lists the various available models of this conveyor and the distinctive features of each.

2492-L

Paint Circulating Bulletin No. 550—Paint circulating systems, which enable manufacturers to finish parts and sub-assemblies in perfect color match and finish, and the advantages to be derived therefrom, are described in a new four-page bulletin just received from Binks Manufacturing Company, Chicago, Ill.

2493-L

Story of Synchronous Motors—Two new bulletins, one eight-page and one four-page, are now available dealing with bracket- and pedestal-bearing types of synchronous motors. Illustrated are features of fabricated steel frame, modern bearings, multi-layer insulation and new splash-proof and drip-proof protective construc-

tion. The two bulletins cover respectively low-speed (below 500 rpm.) and high-speed (above 500 rpm.) motors. They are published by Electric Machinery Mfg. Company, Minneapolis, Minnesota.

2494-L

New Welding Process—"The Development of the Gas Shielded Metal Arc Welding Process" is a six-page folder recently made available by Air Reduction Pacific Company, San Francisco, Calif. The material therein was originally presented as a paper before the Annual Meeting of the American Welding Society this year, and describes a new welding process the company has developed, called "Aircomatic."

2495-L

Industrial Furnace Catalog—The Denver Fire Clay Company of Denver, Colo., has published a 28-page two-color catalog describing and illustrating their complete line of furnaces. Included in the listings are forging, heat treating, melting, assaying, laboratory and testing furnaces. The Denver Fire Clay line of pottery kilns is also described. This publication will undoubtedly be of interest to all requiring industrial furnaces in their work.

2496-L

Waste Disposal Treatise—Engineers, plant executives, superintendents desirous of learning of new methods of industrial waste disposal will be interested in a comprehensive 43-page catalog from The Brown Instrument Company, Philadelphia, Pa., describing how a more expeditious disposal of industrial waste may be effected through the use of measuring and controlling instruments.

2497-L

Wood-Treating Manual—The American-Wood-Preservers' Association has recently revised its manual of standards for treated wood, and made it available in loose-leaf form with a black fabricoid ring binder. The revised manual contains 150 pages, and the standards listed in it have been re-grouped for easier reference under the principal subjects: Preservatives, Treatments, Methods of Analysis, and Recommended Practices. It is especially intended to aid architects, design engineers, specification writers.

2498-L

How to Choose a Magnetic Pulley is explained in two new eight-page catalogs recently issued by Dings Magnetic Separator Company, Milwaukee, Wis. Their pulleys are designed to protect valuable machinery from tramp iron damage, and to remove tramp iron from products such as foods, chemicals, plastics, reclaimed rubber, scrap, cotton, etc., as well as many other uses detailed in the catalogs, which also contain diagrams and specifications.

2499-L

Autocall Folder—The Autocall Company, Shelby, Ohio, have just issued a new folder illustrating and describing their audible-visual Annunciators for industrial and public utility signalling purposes. An important feature of the folder are the detailed diagram-drawings of wiring set-ups showing how the Annunciators work.

2500-L

Safety Valve Data Book—Farris Engineering Corporation, Palisades Park, New Jersey, have just brought out their Catalog 48, which contains 72 pages of data on safety and relief valves. Included in the book are comparison and selection charts which give a quick key to the proper selection of a valve. Triple capacity tables list water, air and steam capacities for various nozzle orifice sizes, as well as a new tight vapor sizing chart, which enables the valve user to quickly size a valve.

Reading Guide For Western Management

A service for all management levels . . . current literature surveyed and appraised by the faculty of the School of Management, Golden Gate College

Contemporary Unionism in the United States

By Clyde E. Dankert. McGraw-Hill Book Co., Inc., New York, 1948. \$5.00.

In this recent addition to the Prentice-Hall Industrial Relations and Personnel Series, the author, who is a professor of economics at Dartmouth College, states that books relating to American unionism may be divided into three principal categories:

- (1) Voluminous and comprehensive textbooks.
- (2) Specialized reports of original research.
- (3) Popular journalistic works.

As he readily admits, this book is narrower in subject matter than those in the first category, less detailed than those in the second, and more restrained than material found in the third. Professor Dankert's book contains some original matter, but consists mostly of rearranged material from other sources. Although originally written before the Taft-Hartley Law was passed, it has been altered in light of the Act.

The book's 500 pages are divided into 27 chapters, some devoted to such aspects of unionism as union history, structure, principles and activities, composition and membership, jurisdiction, functions, rules and policies and weapons and leadership; while others discuss union-management cooperation, unions and politics, collective bargaining, wages, hours, and the general welfare. Detailed discussion of A.F.L., C.I.O., and independent unions is supplemented with 10 tables and lists of international unions.

Professor Dankert writes without evident bias, and covers his subject with both comprehensiveness and comprehension. Using numerous references and footnotes, he draws from many sources to make his text both lively and well-rounded. This work is worthy of use as a source of information on modern unions by executives concerned with labor matters, or, for that matter, by anyone else who wants to know more about unions and unionization. Also, it will prove to be an excellent textbook for college classes in the history of the union movement and a valuable supplementary text for courses in general labor-management relations.

Reviewed by:

THEODORE B. LYMAN
Lecturer in Labor Relations

Economics of International Trade

By Hugh K. Killough & Lucy W. Killough. McGraw-Hill Book Co., Inc., New York, 1948. \$5.00.

This is the second and revised edition of

a well-known text in the field of International Economics first published shortly before the war. The purpose of the revision was not only to bring the descriptive material up to date, but also to place more emphasis on economic principles underlying the workings of international trade.

In the first of these aims the authors have been rather successful. The reader will find a lucid presentation of the operation of such institutions as the International Monetary Fund, the International Bank for Reconstruction and Development, and the International Trade Organization; he will also find a good description of the commercial problems and policies of the major powers during the last decade.

Those looking for an account of the developments of international trade theory in the recent past will be disappointed. There is hardly any mention of the critique of the classical and neo-classical position, as formulated by Ohlin and others, and there is insufficient recognition of the application of the ideas of imperfect competition to the field of international economics. Further, the notions of underemployment and their international consequences as presented in this text do not show the utilization of the leading publications that have appeared here and in England for the past 10 or 12 years. Consequently, the gap between the theoretical and the institutional parts of this book is wider than seems necessary to this reviewer.

Reviewed by:

FREDERICK A. BREIER
Lecturer in Economics

The Management Guide

By George Lawrence Hall. Standard Oil Company of California, San Francisco, 1948

The Department on Organization of the Standard Oil Company of California has made several notable contributions to improved management techniques and procedures. The latest of these contributions, *The Management Guide*, has perhaps the widest application of all. Briefly, it is a 100-page, chart-illustrated manual describing the preparation and use of "management guides."

The literature of management is replete with references to position descriptions, organization charts, definitions of authority and responsibility, line and staff activities, and how all such things should be contained in "organization manuals" for the continued use of the company's management. There has been, however, no complete reference as to the manner in which such material is prepared, how it may best be presented, and the methods of utilization that will produce the best results: namely, *better management*. *The Manage-*

ment Guide fills this gap in management literature. It is a valuable handbook for those who are interested in finding out the "why and how" of the *management guide* as a special tool of management.

The practicality of this work is demonstrated by the fact that, for purposes of illustration, a hypothetical company is described. The scope, responsibilities and authority, and relationships of typical key positions, from the president down, are presented as examples of the method used by Standard to clarify and delineate its management positions.

Western industrial management can be proud of this Western contribution "to sound management everywhere." It is, moreover, a shining example of enlightened management technique in a system of free enterprise.

Reviewed by:

J. M. TRICKETT
Vice-President, Golden Gate College
Lecturer in Management Organization

Briefer Guides From The Management Library

Industry-Wide Bargaining

By Leo Wolman. The Foundation for Economic Education, Irvington - on - Hudson, New York, 1948 (pamphlet).

The trend in America at present is toward an increasing practice of industry-wide bargaining. The author believes that labor is becoming a monopoly, and that employers who support industry-wide bargaining are helping to bring about this development. He examines the problem from the standpoint of one who deplors special privileges and monopoly powers wherever they exist.

Company Medical & Health Plans

National Industrial Conference Board, Studies in Personnel Policy No. 96, 1948 (pamphlet).

About 500,000,000 man days are lost from work annually because of illness. The cost is estimated at \$10,000,000,000 a year. Experience shows that improved working conditions and company health programs can reduce absenteeism due to illness. This report, based on a survey of medical and health programs in 333 establishments, discusses per capita costs of medical services, budget items, and salaries for medical personnel.

Freight Rate Application

By Glenn L. Shinn. Simmons-Boardman, New York, 1948 (book).

A presentation of the rules or principles of tariff interpretation which govern the determination of applicable freight rates under section 5, paragraph 7, of the Interstate Commerce Act. Appropriate illustrations and explanations are included.

The Location of Economic Activity

By E. M. Hoover. McGraw-Hill Book Co., Inc., New York, 1948 (book).

This book presents a comprehensive analysis of the factors to be considered when locating economic enterprises in different sections of the country.

Reviewed by:

BERNA M. CARLSON
College Librarian

REGIONAL REVIEWS

TEHACHEPI TO TIJUANA

Cross Currents of More Home Hunters and Less Vacationists

Some Smaller Industrial Corporations Having Difficulties; Other Manufacturers Succeed by Developing New Processes and Markets

LOS ANGELES — Puzzling cross-currents are warning skippers of local industrial enterprises that shoal waters may lie ahead.

Consider, for instance, the flood of California-bound visitors swarming in by rail, motor car, airplane, box car, and on foot. This fall the Automobile Club of Southern California totted up its running surveys and announced that during the past nine months, 781,445 arriving cars had just brought an all-time high of more than 2,000,000 passengers into the state.

Yet about the same time the All-Year Club found midsummer tourist business had dipped about six per cent below last year's rate. This meant noticeable inroads into the money crop of some \$12,000,000 in tourist revenues usually harvested by the travel business of southern California in July.

Key to Paradox

Managing Director Don Thomas probably gave the key to this paradox when he drew a distinction between the receding tourist traffic and the parade of California-bound home hunters, which continues at peak strength. Supporting this point of view comes a Hotel Association estimate that local hostels now show a vacancy factor running as high as 28 per cent. One of their officials currently is on a swing of eastern cities to spread the word that rooms are available in Los Angeles, without the former five-day limit on stays.

The All Year Club itself is mulling over two proposed national advertising campaigns, one designed to promote year-round business under the headline, "We Never Close in Southern California"; the other, aimed at inviting eastern executives to combine vacation with a business inspection of this area.

Another puzzle is a contradictory situation in the employment field. Recent figures show that local factory employment has advanced to the highest levels since the all-time war peak, topping the previous postwar high of late 1946. They indicate that local industry has consolidated its gains at a level about 50 per cent of

the 1944 high-water mark, but about double the 1939 figure.

Yet, at the same time, unemployment claims have crawled upward, too. It takes no soothsayer to discern here the key factor — the effect of the continuing influx of job-hunters and home-seekers from other areas.

Competition for jobs, competition for business, have brought a deep, grass-roots realization that the free-spending days of the "fast buck" are gone — that there now are too many spoons dipping into the same bowl of consumer buying power.

Some observers declare that competition is keener now in Los Angeles than anywhere else in the U. S. except perhaps New York City. For instance, permits issued by the Los Angeles city clerk to new retail establishments have been issued lately at the rate of more than 1,000 a month — but the net gain in retail outlets averages only about 150 a month, the rest representing turnover of existing shops.

Board of Equalization tallies indicate that an average of 44 out of every 100 local trade outlets showed a change in ownership during the past year. While these figures include additions and withdrawals of partners, switches from proprietorship to partnership or corporation or vice-versa, as well as sales, liquidations, and outright failures, certainly innumerable profitless undertakings have been handed along as speedily as a hot potato from one disillusioned owner to the next hopeful purchaser. The rate of change varies from 68 per cent among cafes and bars and 53 per cent for gas stations and cigar stands to 22 per cent for drug stores and a rock-bottom 13 per cent for retailers of caskets and tombstones.

Much the same thing has been going on among small industrial firms. One local plating business, typifying this activity, is reported to have passed through the hands of at least eight successive owners since the war's end. Sold at an exorbitant price on the basis of its huge wartime profits, it soon failed to earn a decent living for its new proprietor.

As it passed along to others, various infirmities of its equipment became manifest. Anodes were nearly worn out by countless hours of plating on war contracts. One morning the arriving proprietor found a lake of valuable plating fluids filling the workroom floor and flooding the front sidewalk. An aged tank had sprung a leak during the night. Meanwhile the firm's reputation suffered from poor work done by some of its procession of owners, who lacked the skilled craftsmanship of the men who had built it up through the years.

Multiply this dismal saga by the number of inexperienced operators who bravely launched new manufacturing enterprises when their jobs on local production lines ended, and you explain the recent softening of the market for industrial and commercial real estate. Considerable vacancy is appearing among small commercial shops, while more than one plant site can now be bought for perhaps half last year's asking price. A buyer's market has developed — something of a novelty in this decade.

Eyes Still on Area

Not, of course, that there has been a let-up in the march of new business to southern California, for large eastern enterprises still have their eyes on this area as the location for branch plants or Western outlets. But the little fellow, the shoe-string operator, and the speculator, are finding that the outlook is getting tougher day by day.

Turning from this gloomy picture, however, one can find plenty of activity that shows the steady birth of new processes by which Western industries are creating new markets as they go along. For instance, Harvill Corporation, an important wartime producer of high-pressure moldings of stress parts for airplanes, has developed a number of new civilian markets for die-cast products. Typical example: a die-cast axle, sold to a baby buggy company after Harvill showed the makers that the finished product not only looked and worked

(Continued on page 72)

Steel Problems?



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HOUSTON
5311 Clinton Dr.
Charter 4-1761

TEHACHAPI TO TIJUANA

(Continued from page 70)

better, but was cheaper in the long run than the axle formerly used. Because of advancing costs of other metals, Harvill has concentrated more and more on magnesium, which it uses in many products.

Half of Goodyear's local synthetic rubber-producing facilities are being converted to the new "cold" rubber process which is said to increase tire tread mileage substantially but costs no more to make than the previous synthetics.

Out of knowledge gained in years of experiment with clays and other substances used as purifiers and catalysts of petroleum products has come a new outlet for the production of Filtrol Corporation. The product is a coating for seeds, which keeps them alive in cold weather, stores moisture, protects against hungry birds and winds that blow tiny seeds away, and even contains chemical foods that promote growth.

Unlike other substances previously used, Filtrol's material permits the seeds to "breathe," expelling carbon dioxide and absorbing oxygen — thus permitting the coated seed pellets to be stored for years without dying. The pellets are credited with recently saving a tomato crop from blight when untimely wet weather hit Sacramento Valley. An extensive Western

market is believed open for the new local product.

AiResearch has taken advantage of one of the "bugs" handicapping aviation's recent advance into the realm of supersonic flight by creating a product whose market appears to be a foregone conclusion. It is a remarkable turbine cooling unit which, weighing only 16 pounds, produces 4.2 tons of refrigeration.

Hot compressed air is bled from the jet plane's motor and dropped 500 degrees in temperature, thus dissipating the intolerable heat developed in airplane cabins as the thin air of the stratosphere is compressed to a breathable density. Otherwise, pilot and passengers might literally fry at temperatures soaring far above the boiling point. A companion device is a seven-pound instrument which automatically maintains air pressure at a comfortable level.

These are but several of the many job-creating new processes that are enabling enterprising manufacturers to build for the future, regardless of the humps and dips in the economic graph. How much other important research has been going on behind closed doors, under sponsorship of the armed forces, was just revealed when the top secret "Rand Corporation" at Santa Monica was made known to the public.

Though the announcement was in veiled terms, the organization's 250 experts plainly have been doing some fundamental spade work in the field where the Buck Rogers realm of futuristic warfare must mesh gears with private industry. The scientists are privately hired and paid, giving the project a non-governmental character, but military blessing was given in a manner calculated to protect national security. Douglas Aircraft set up the organization in 1946 as "Project Rand," under Air Force sponsorship, with a board of directors comprising some rather famous names in science and industry.

So little is known about the true nature of the research that speculation generally takes the view that such problems as inter-continental missiles, rocket warfare, and perhaps atomic energy applications may be under study. It is certain that the ultimate result will be to set some of the patterns Western industry will follow in armament programs of the future.

Out of a former surplus war plant once operated by North American Aviation adjoining L. A. Municipal Airport are now rolling the first Nash automobiles to be built outside Wisconsin. Known as Plant No. 10, the 30-acre tract, with some nine acres under roof, will account for assembly of about 10 per cent of Nash's total



Urgent

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production when the whole Nash organization gets up to full capacity of some 250,000 cars a year. Says Plant Manager Campbell Wood, "We expect to purchase locally as many parts and supplies as possible."

Two little-publicized events recently signalled passing of a milestone on the way to full integration of the West's power facilities. One was signing of contracts whereby excess power generated at the new Davis Dam will be "wheeled" along lines to be built by the U. S. Reclamation Bureau to substations feeding a wide area in Arizona. The other was completion of Southern California Edison's three-year change-over program from 50-cycle to 60-cycle current.

The difference between the frequencies of power produced by Edison and most other California utility companies was a stumbling block during the war, since power interchange thus required frequency changers, which became bottleneck points. Now power can be "traded" freely from area to area to iron out peak loads, eliminating waste of precious hydroelectric power by idling generators and saving cost of fuel in standby plants.

Port Expansions

Expansion of the Port of Los Angeles by \$11,000,000 worth of new facilities will get started shortly. A \$4,000,000 modern passenger freight terminal, an 800-foot, \$1,500,000 concrete wharf and transit shed extension providing berth space for fishing craft, and \$550,000 worth of new municipal fish markets are on the schedule, the latter providing facilities worthy of what native sons prove with appropriate statistics to be the nation's number one fishing port, both in weight of fish landed and value of the catch.

Recent ending of the strike which tied up southern California fishing boats for a protracted time has not solved all that industry's problems. Many months ago the fish that long abounded here turned coy and failed to appear in their usual numbers. Then suddenly the pilchards began running. Boats swarmed in from all along the West Coast. Cannermen soon were swamped and began protesting that too many small fish were being brought in. Behind their demands for a lowered price scale to be paid boat captains for their catches lay also an increasing resistance by housewives to high prices for canned fish.

The shipping strike, cutting off export markets for fish, helped pile up warehouse inventories. Last straw for this harassed West Coast industry, which yields as by-products about 10 per cent of the nation's vitamin A and D output, as well as some 2,000 cars annually of fish oil for paints and other purposes, was a new fear of competition from the fishing fleets of Japan.

Worries of local fishermen were poured out to Secretary of Interior Krug when he recently visited here. Pointing out that General MacArthur is anxious to help

Japanese industry become self-supporting, lightening the load upon American taxpayers, Krug said his department nevertheless will oppose shipment of the Japanese produce to the U. S. in competition with domestic fisheries. About 100 purse seiners operate out of Los Angeles, each seiner carrying 11 to 14 men and representing an investment in the neighborhood of \$100,000.

Laboratory Produces Oil from Sandstones

Bureau of Mines reports high recoveries of valuable hydrocarbons suitable for making gasoline, Diesel fuels and fuel oils

from surface deposits of bituminous sandstones near Edna, San Luis Obispo County, California.

The report, describing a hot water separation process tested on a laboratory scale, shows recoveries of bitumen averaging 95 per cent from the Edna sandstones. Bitumen is the tarry substance from which gasoline and oils are extracted. These deposits are estimated to contain about 11 per cent bitumen or about 26 gallons per ton.

Edna sandstone deposits are estimated to contain about 282,880 tons of bituminous material minable by open-cut methods alone.

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HYDRAULICS
MACHINERY PARTS
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REGIONAL REVIEWS

SIERRAS TO THE SEA

Election Returns Do Not Halt Industrial Development Plans

Power and Irrigation Outlook Also Much Brighter; Some Shipping Gains Made Despite Strike; Navy Purchasing Becomes Increasingly Important

SAN FRANCISCO—One of the favorable signs on the year-end horizon is the fact that corporations who have bought factory sites are beginning to go ahead with development plans. Evidently the long-range picture continues to look good to them, and election results did not hold them back.

Another good indication is that there are good early snows in the Sierras, which means no rationing of electricity this year, and more water for irrigation. Thirty inches of snow now lie where last year there were five inches or less. Also, more than 500,000 kilowatts of additional electric power will be available this spring, the Pacific Gas & Electric Co. promises.

It is still too early to assess the long-term effects of the 95-day longshoremen's strike. Whether shippers will be convinced that they can now ship through West Coast ports without having their freight stranded in warehouses, on docks, or in shops tied up in port for indefinite periods while industrial disputes are settled, is difficult to say. It seems likely that it will take considerable time before their doubts are banished, and much effort to counteract the tendency to use Gulf or Atlantic ports and the Panama Canal for shipping to and from the Far East.

Some indication of the revenue losses to steamship operators is given in the statement of Albert W. Gatov, president of the Pacific American Steamship Association, that cargoes valued at \$605,000,000 were not shipped during the strike. There were 185 ships tied up in various coast ports. Wage losses to longshoremen are estimated at \$1,100 each.

Despite the big interruption caused by the strike, the Western Transportation Conference has made some progress in meeting the problem of declining steamship business on the Pacific Coast, and now that peace prevails again in the various Pacific Coast ports further gains are expected.

As the result of the efforts of a committee headed by Charles Howard of Howard Terminals, Oakland, the amount of

crude rubber imports passing through Coast ports in 1948 was 8 per cent of the national total, against 4 per cent in 1947. Also ore tonnage moving through Long Beach has increased, and the coal tonnage moving through Coast ports to the Orient. Long Beach would have benefited even more but for the strike, according to the steamship people.

Navy purchasing in the San Francisco Bay area amounts to \$50,000,000 to \$60,000,000 a year, according to Lt. Commander S. J. Major of the Navy purchasing office in San Francisco. As an example of procurements, he recently told the Western Chemical Market Research Society that chemical purchases alone amounted to around \$2,500,000 annually, divided up as follows:

Alkyd Resin	2,500,000 lbs.	\$608,000
Linseed Oil	424,000 lbs.	125,000
Paints and Lacquers	75,000 gals.	210,000
Naphtha & Thinners	210,000 gals.	45,000
Driers	200,000 gals.	45,000
Titanium Calcium	815,000 lbs.	60,000
Acids	580,000 lbs.	50,000
Formaldehyde	250,000 lbs.	14,000
Solvent	421,000 gals.	65,000
Rosin	700,000 lbs.	61,000
Oxygen	4,800,000 cu.ft.	45,000
Propane & Butane	110,000 gals.	42,000

Increasing transportation costs and the trend away from basing point pricing systems are likely to increase the amount of buying in the San Francisco area, he predicted.

Gas Rate Fought

California Manufacturers Association have succeeded in getting a postponement of the latest gas rate increases sought by the Pacific Gas & Electric Company and Coast Counties Gas & Electric Company. The Association contends that six separate increases already obtained by these companies since August, 1946, have boosted the first utility's industrial gas revenue by \$11,868,000 a year and the second's \$2,500,000 a year, which in each case would be more than the utility's total revenue from the sale of industrial gas in the year 1946.

P.G.&E.'s average revenue per thousand cubic feet in 1945 was 14.5c, according to

the association, while by February of 1948 the average revenue for the same classes of service was 35.49c, an increase of 142 per cent. Coast Counties' average industrial revenue in 1945 was 13.6c and in 1947 25.5c, an increase of 87 per cent over 1945, without including a rate raise in January, 1948, estimated at another 6½c. The latest requests, which the California Public Utilities Commission has held up, stem from the escalator clause which ties gas rates to the prices of heavy fuel. The latter were raised 10c a barrel by Standard Oil on Nov. 12, 1948.

Motor Factory Opens

General Electric has opened its new \$3,000,000 motor manufacturing plant in San Jose, where ultimately all of its output of single-phase integral horsepower motors will be produced. These motors are widely used in home, farm and industrial applications, such as air compressors, home freezers, home work shops, farm machines, etc. Polyphase motors, five to 500 horsepower, for irrigation pumps are also being manufactured, and will be distributed entirely in the Western market.

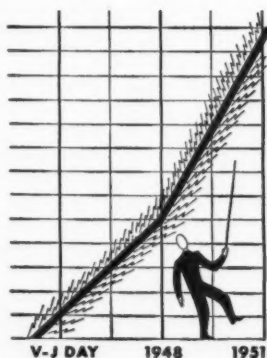
Production rate of more than 1,500 motors weekly is expected early in the spring, and the new plant eventually will employ 500 persons, bringing G-E's operations in the San Francisco Bay area up to about 1,200 people. H. V. Erben, vice-president and general manager of the company's apparatus department, who presided at the opening ceremonies at San Jose, revealed that the Oakland transformer factory is now being converted into a self-contained unit for the complete manufacture of distribution transformers in the 1½ to 1,000 kva range for use by industries and utilities in the West.

Another new development in the San Jose area is the setting up by the Du Pont company of an experimental farm for testing agricultural chemicals in soil and climate representative of central California. It will expedite research with chemicals for insect control, parasitic diseases and weeds. The farm will be operated by the Grasselli Chemicals Department of Du Pont.



P. G. and E. adds 404,000 new electrical horsepower in 1948

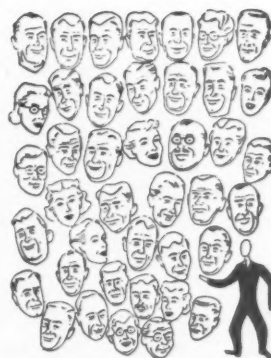
and 1½ million more on the way



Record power growth. P. G. and E. began building new power plants immediately after V-J Day. 404,000 new horsepower were installed this year. 1½ million more will be added in the next 3 years.



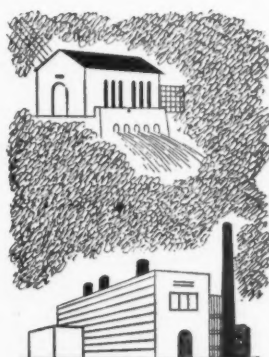
\$300,000,000 already invested. Most of the money for expansion comes from invested savings of thousands of people—many of them your friends and neighbors. They are the real P. G. and E. builders.



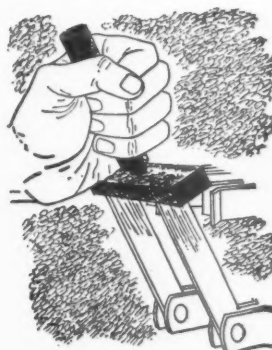
148,000 stockholders, mostly Californians, have put their savings in P. G. and E., becoming partners in one great enterprise. Few companies in the entire nation are more widely owned.



More than 7,000 jobs have been created by the expansion. This additional payroll has materially helped all sorts of business throughout the area we serve.



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REGIONAL REVIEWS

THE PACIFIC NORTHWEST

New Industry Possibilities for Lower Columbia River Area

Sugar Refinery, Heavy-Duty Truck Tires, Rayon and Cellophane Are Given Study; Alcoa to Produce Rods, Bars and Cables at Vancouver

PACIFIC NORTHWEST—A study of possible new industries in the lower Columbia River area based on imported or off-shore raw materials has been made by Chester K. Sterrett, industrial department manager of the Portland Chamber of Commerce, for the Raw Materials Survey.

His report says that one of the basic needs for all ports on the lower Columbia is additional off-shore materials, to aid in the balancing of incoming cargo with outgoing movements. The list of possibilities includes the following:

Refining of cane sugar, manufacture of heavy duty truck tires for the logging and lumber industries, production of ferro-chrome or stainless steel, manufacture of rayon and cellophane, margarine and other edible oil products, soap, pig iron and steel, abrasives and electrolytic zinc, and the roasting of coffee.

Three of these—ferro-alloys, stainless steel and electrolytic zinc—are dependent on the availability of large blocks of low-cost electric power, therefore are considered out of the question at present in view of the critical power shortage in the Pacific Northwest.

Might Have Sugar Refinery

Refining of Philippine cane sugar is suggested because the only two cane refineries on the Pacific Coast are located on San Francisco Bay and are owned by California & Hawaiian Sugar Refining Company, a cooperative association of Hawaiian sugar planters who would hardly be interested in handling a Philippine product. The Philippine plantations, which produced about 1,000,000 tons prewar, got back to 380,000 tons of raw sugar in the 1947-1948 season and are reported as bringing 200,000 tons of this amount into the United States. A new refinery using the ion exchange process (featured in the January, 1947, issue of *Western Industry*) might be built for a nominal investment compared with the large capital outlay required by a plant using the bone charcoal method.

The fact that the Chromium Mining & Smelting Corp., Ltd., who have recently

leased the government-owned ferro-alloy plant at Spokane, are already importing chrome ore from New Caledonia, plus the fact that additional sources of high-grade are available in the Philippines, is cited as reason for believing that the material could also be brought into Portland for the production of ferro-chrome or stainless steel. The U. S. Bureau of Mines is also experimenting at Albany, Ore., on the possibility of making stainless from southern Oregon chrome ore and nickel available in ore from Riddle, Ore., and Cle Elum, Wash.

Cellulose and Aluminum

Rayonier, Inc., with several plants in Washington, and the British Columbia Pulp & Paper Co. of Vancouver, B. C., have for several years supplied the major portion of alpha cellulose, or dissolving wood pulp, used in the rayon industry of the United States. Now the Columbia Cellulose Co., a subsidiary of the Celanese Corporation of New York, is also building an alpha cellulose plant at Prince Rupert, B. C., and the first pulp plant in Alaska is to be built by the Ketchikan Paper Co., a joint venture of Puget Sound Pulp & Timber Co. and American Viscose Corp. With such a nucleus of pulp plants already established, manufacture of rayon and cellophane in the Pacific Northwest is assumed to be a reasonable future development.

The Raw Materials Survey report says it is almost a certainty that Aluminum Company of America will set up a plant to make alumina from Oregon laterites in the immediate future, and that when this step is taken Alcoa probably will use off-shore bauxite instead of hauling it by rail from Arkansas. Since alumina in its purified form can also be used to make high-grade abrasives, the Carborundum Company, which is building a silicon carbide plant in Vancouver, Washington, would be the logical manufacturer, according to the report.

Although Alcoa only ranks third in production of pig aluminum in the Pacific Northwest, it will become the first pro-

ducer of rods, bars and aluminum power transmission cable on the Pacific Coast. A \$7,000,000 expansion of its Vancouver, Washington, plant has been announced, the major portion to be used for a new unit to fabricate the products mentioned. About \$1,000,000 will go toward remodeling the present reduction plant and install fume collecting devices.

Meanwhile the government's equity in the Troutdale and Mead reduction works and the Trentwood rolling mill, under lease to Reynolds and Kaiser, has been considerably enhanced by an agreement signed by Alcoa with War Assets Administration, which will make many of its patents available without royalty to the rest of the industry. This agreement means that Reynolds and Kaiser will have access to all of Alcoa's alloy patents, and will be able to use its basic patent on the so-called "direct-chill" process of casting aluminum. For various fabricating patents moderate royalties will be paid.

More Tree Farms

More acreage was brought into the "tree farming" program in Washington and California in six weeks in October and November of 1948 than in any comparable period in the history of the program. Thirty-one new tree farms were certified, covering 53,037 acres, bringing the total in the Western Pine region to 2,694,447 acres.

Largest of the group is a 23,680-acre tract of the Klickitat Pine Box Company, Klickitat, Wash., the third largest in the Western Pine region of Washington. It consists of previously-logged land now covered with vigorous young stands of Ponderosa Pine and inland Douglas Fir. Smallest is the 16-acre woodlot of Rodge S. Coate of White Salmon, Wash.

Disposal of the war-built, government-owned alcohol plant at Springfield, Oregon, apparently is in sight. The Wood Waste Chemical Company of Milwaukee submitted a bid to War Assets Administration on November 18 that was better than any previously made by either this company or others, and there are also indica-

tions that if the Milwaukee bid is not accepted in its present form, an agreement can be negotiated.

The Salem alumina-from-clay plant is now back in the government's hands again, J. R. Simplot of Boise and J. O. Gallagher of Seattle having canceled their contract to purchase for \$750,000. They have taken a lease on the property until June 30, 1949. It will continue to be used by them to make anhydrous ammonia fertilizer.

Earlier estimates of 1,400,000,000,000 feet proven and nearly 2,200,000,000,000 feet probable natural gas in the Alberta fields will be considerably exceeded, according to Dr. George S. Hume, chief of the Geological Survey of Canada. His report of his survey has been submitted to the Alberta commission studying the natural gas situation.

Northwest Wood Products Clinic will be held in Spokane April 12 and 13, with kiln drying of lumber as the theme for this year.

Portland could become the new major overhaul base of Northwest Air Lines, if it had the facilities, according to President Croil Hunter. He said his line had outgrown its present base at the Twin Cities. Hangars and 1,000,000 square feet of space would be required.

Labor-Employer Peace Plan

A labor-management plan to foster industrial peace will be the subject of a conference in San Francisco late in February, according to an announcement by P. C. Fahnestock of New York, information director of the Committee for Economic Development.

Five outstanding economists are associated with the labor-management study for C.E.D.: Douglas V. Brown and Charles A. Myers of Massachusetts Institute of Technology; Sumner Slichter of Harvard; J. Douglas Brown, Princeton, and George W. Taylor, University of Pennsylvania.

Among the 13 businessmen taking part in the program are J. D. Zellerbach of San Francisco, president of Crown-Zellerbach Corp.; Paul G. Hoffman, Studebaker president; Eric Johnson, president Motion Picture Producers, and William A. Patterson, president United Air Lines.

Western States Council

At the annual meeting of the Western States Council to be held in Boise late in March, a special committee to study certain phases of Western development will report, covering such subjects as reclamation, fuel and energy, and transportation. It is planned to devote a whole day to these matters, in preparation for a general conference proposed for next fall.

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Gas and Power Shortages Loom In Colorado and Wyoming

Brownout in Prospect For Northern Colorado; Court's Decision on Gas Important; Pueblo Gets Piston Factory From Chicago

DENVER—Power shortages in the Rocky Mountain region now have the area frankly worried. This in spite of the fact that the region has the nation's greatest potential hydro-electric development, plus the greatest coal deposits in the western world, plus fast-growing reserves of petroleum and natural gas and uncounted millions of BTU's stored in mountains of oil shale. None-the-less, the immediate future is anything but bright, in terms of power actually available. Here are some straws in the wind:

1. University of Wyoming may be cut off from its natural gas supply as the nearby gas field peters out, unless some new source is developed within a year or so.

2. Northern Colorado is getting ready for brown-outs in 1949 when the inadequacy of power will become all too apparent.

3. Casper's supplier of electric power, Mountain States Power Co., was cut off by its source of natural gas, the Northern Utilities, Inc., in the early winter freezeup of November. The gas is used to generate steam in the Casper generating plant of Mountain States Power. The steam plant mentioned is a supplementary power source sorely needed right now because of the power shortage all over eastern Wyoming and northeastern Colorado. Northern Utilities, Inc., is taking care of its industrial customers, including the Holly Sugar Corp., plant at Torrington, Wyo., but no new customers are being sought.

4. Dams that are used for irrigation as well as for power development have a low firm power, with power output dropping to almost nothing when reservoirs are being filled and power to spare when heavy withdrawals are being made for irrigation and consequently pulling water through the turbines.

Perhaps the Rocky Mountain region will have to turn back to its enormous resources of coal, not in the dim and distant future when oil and gas reserves are exhausted,

but in the immediate future. Steam plants don't let you down, if the plant is fueled by coal from nearby, of which this particular area has gobs and gobs.

The change in political climate in Washington is considered bullish from a power standpoint, with umpty-ump millions now earmarked for public power development. While private power interests have done their best to spike such developments, the shortage situation now is getting sufficiently grim to bring about some such marriage of public and private power interests as has been seen in the Northwest's power pool.

Natural Gas Has Its Day

Developments in the gas business are happening almost too fast to keep track of. Southern California already is sucking enough natural gas through the big pipeline of the El Paso Natural Gas Company to equal five times the total BTU output of Boulder Dam, and that gas all comes from southeastern New Mexico and adjoining Texas fields in the Permian Basin.

But what gas it gets now from the mountain states area only whets its appetite, and Southern California is getting set to buy more and more. A new pipeline is projected to supply gas to the Los Angeles area from northern New Mexico and the "four corners" country where Colorado, Utah, Arizona, and New Mexico meet. A spectacular oil find in this region, in the Dove Creek section of Colorado's Montezuma county, has put this region in the limelight as "another Rangely." But whatever it may have in oil, it definitely does have a huge gas reserve, and the only question is how many gas-hungry areas can it serve.

With most of Wyoming in the grip of a serious gas shortage, despite the huge Church Buttes gas and distillate field in the southwestern corner of the state, people are beginning to wonder if Wyoming might not be able to use Church Buttes gas rather than seeing it all go to the Salt

Lake City area. Perhaps, they say, the new Four Corners gas field can be tapped to supply the needs of Salt Lake and the steel mills area at Geneva, leaving the Church Buttes field to take care of southern and central Wyoming. Several promising gas and oil structures in western Colorado, eastern Utah, northeastern Arizona and northwestern New Mexico haven't been explored thoroughly yet, and drilling in Wyoming keeps opening up new oil fields with an occasional commercial gas reserve.

The Mondakota Case

One interesting factor in the gas picture is the fact that under a recent circuit court ruling, which the Supreme Court decided to let stand without review, anybody can purchase natural gas from producers and move it through common-carrier pipelines for sale to ultimate consumers. It is hard to over-emphasize the significance of this decision, known as the Mondakota case and won by John Wright of Billings, Montana, after a series of court fights that lasted 12 years and cost hundreds of thousands of dollars in fees and lost revenues. It means that competition now exists wherever there is natural gas piped over any portion of the public domain.

Perhaps all interstate gas pipelines in the nation are common carriers today, because of the effect of this decision. Common carriers have to handle anybody's "freight" including natural gas, and deliver it anywhere along the line the shipper may designate. Already, under the Mondakota decision, industrial users of gas in California are finding various suppliers of gas bidding spiritedly for their business with the result that the industrial users now get their gas at a considerable saving.

On the other end of the pipeline, producers of gas in the field are finding that instead of facing a monopoly that pays what it pleases there is competition among various purchasers, each offering a higher

price for the producer's gas, so the producer is getting perhaps twice what he received a few months ago. So far as oil is concerned the interstate pipeline companies still have a virtual strangle-hold on the industry, but not so any more with regard to gas, where the Federal Power Commission has jurisdiction, and competition flourishes once more.

Tom Steals Another Pig

The choicest job awaiting any psychiatrist in the United States is that of examining the contents of the head of the U. S. Attorney General, Tom Clark. In a number of recent cases his contentions have been met with wide-eyed wonder by attorneys supposedly versed in the laws of the land. In a new anti-trust suit brought by Clark's office and naming five Rocky Mountain steel fabricating companies along with Republic Steel Corporation, the contention is so fantastic that people are muttering, "Tom, Tom, the piper's son, stole a pig and away he run . . ."

The charge in the case against Republic names the Thompson Pipe & Steel Co., of Denver; Eaton Metal Products Corporation of Omaha; Eaton Metal Products Company of Billings, Mont.; the H. V. Johnston Culvert Company of Aberdeen, S.D.; and the Wyatt Metal Boiler Works of Dallas, Tex. The complaint alleges that Republic gave each of these firms exclusive territories for culverts made from its steel, reserving certain territory as its own.

Leslie Brown, president of Thompson Pipe & Steel in Denver, displaying infinite patience, commented that the complaint seems to be aimed at the practice of a manufacturer of granting an exclusive territory to a distributor. "We have the right to sell Republic's trademarked products, and I suppose this suit proposes to show that this exclusive right is in restraint of trade."

The upheaval caused by the FOB mill price decision in the cement case, with ramifications nobody in industry can comprehend as yet, will be a minor ripple by comparison to the Republic case, if Tom Clark's contention should be upheld. Except in the consumer goods field, virtually every manufacturer grants his outlets an exclusive territory, and even in consumer goods it is not unusual to see a merchant advertising his presumably exclusive (for his area) line of shoes, hats, suits, radios, cars, and so on ad infinitum. Of course any merchant can sell Wrigley's chewing gum and Bayer's aspirin tablets. Perhaps it is a good thing.

Pueblo's Pistons

Ever eager to stick a hook in the not-insensitive hide of the Denver Chamber of Commerce, Gene Cervi has "told all" concerning the scoop of the Pueblo city fathers in getting the Triplex Corporation

of America to move its huge piston factory to Pueblo from Chicago. This was told in the Cervi News Letter, confidential dope sheet on business and industrial trends published weekly in Denver's sleekly modern Railway Exchange Building. After Denver had had its chance and miffed the job, so Cervi says, his Pueblo readers "dropped their Cervi News Letters, caught an airplane for Chicago, interrupted actual construction work Triplex had started on a proposed factory in East Chicago and switched the million-dollar annual payroll to several idle air base buildings in the steel city, thus saving an ideal manufacturing industry for Colorado."

Pueblo is the fast-growing home of

Colorado Fuel & Iron Corporation's big Minnequa plant, which produces rails and rods, fence, nails and a wide variety of steel products not including those made in a rolling mill. Since steel is now sold FOB the mill, it is expected that many an industry will snuggle close, and the city on the Arkansas looks mighty good to most industrialists who investigate.

F. I. Lamb, president of Triplex, says his company will bring \$2,500,000 worth of machinery and equipment and about 50 key personnel. The rest of the company's 350 employees will be hired locally.

"Currently," said Mr. Lamb, "we manufacture nothing but high quality aluminum

(Concluded on page 81)



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REGIONAL REVIEWS

THE WASATCH FRONT

New Records for Employment in Utah Hung Up in 1948

But For Kennecott Strike, Peg Would Have Been Still Higher; Problem of Unemployment Insurance Compensation Rate Faces Next Legislature

SALT LAKE CITY—Utah wound up 1948 with an all-time high in industrial employment and payroll for the year. The 12-month payroll (covered by unemployment insurance) hit the \$300,000,000 mark, an increase of \$24,000,000 over 1947, which was the previous high. The number of employees in covered industries climbed above the 120,000 mark during the year and was holding steady during the last quarter, although there was a seasonal shifting from construction and farm crop processing to the trades and service industries.

The 1948 payroll reported to the Department of Employment Security would have been approximately \$310,000,000 had it not been for the Kennecott Copper Corp. strike which idled some 5,000 mine, mill and smelter workers.

Payroll for the three-month period ending September 30 set a new quarterly record of \$87,500,000, a gain of \$12,000,000 over the corresponding quarter of 1947. The fourth quarter total may fall slightly below that figure but only because of the mine strike.

The dollar increase, it should be noted, reflects inflation as well as some solid gains in industrial activity.

B. L. Flanagan, director of the Utah Department of Employment Security, expects the upward trend to continue through 1949, barring a slump in the national economy. One of the major reasons for his optimism is the fact that the 1948 record was established without a boom in any one industry, such as construction during the war. On the contrary, it resulted from moderate gains of established industries and the establishment of a few new ones.

For the next several weeks Utah industry and business will be suffering from an acute attack of legislative jitters. The Democratic sweep put that party in control of both branches of the legislature. And the majority party members were elected on a platform which commits them to several actions which are distasteful to the more conservative Democrats.

Among the platform commitments are repeal of the Clegg-Vest labor act (the state's version of the Taft-Hartley act); repeal of the old age pension lien provision, which will add a few more million dollars to welfare costs; enactment of some type of severance tax on natural resources; and liberalization of the various industrial compensation programs.

The demands for additional revenue will be numerous and strong — from state departments, schools, cities and counties. And while no one but the most "liberal" Democrats relishes the idea of imposing new taxes or hiking old ones the law-makers are going to have to say "no" on the spending side or "yes" on the taxation side.

The hope of the conservatives is that one or two conservative Democratic senators (the party has a majority of only one in that body) will join with the Republicans to keep the session on a middle-of-the-road course.

"Charge-back" Fought

One of the specific employee-employer issues that will come before the 1949 legislative session is the method of determining the unemployment insurance rate. The 1947 legislature adopted a "payroll variation" plan (which was generally acceptable to labor) with a provision that a "charge-back" system (generally favored by employers) would automatically go into effect in 1948 in the absence of further action by the legislature. Labor will certainly press for further action in the forthcoming session as they are unalterably opposed to anything resembling the charge-back plan.

Heretofore unemployment compensation legislation has been worked out by labor and employer groups in advance of the meeting of the legislature, and their compromise products presented to the lawmakers for ratification. An effort is being made to do the same thing this year, so it is still possible that the legislators will be spared the pains of resolving this problem.

Kennecott Copper Corporation have awarded a lead construction contract cov-

ering the installation of between 5,000,000 and 6,000,000 pounds of sheet lead, lead pipe and other lead apparatus at Garfield, Utah, to the Andrews Knapp Construction Company, Inc., of New York City.

The Andrews Knapp Construction Company is a wholly owned subsidiary of Knapp Mills, Inc., producers of chemical and process equipment and lead-lined products. The new Kennecott Copper Refinery, when completed, will have an initial capacity of 12,000 tons of refined copper a month.

Forecasting Conference in Los Angeles

A forecasting conference for southern California has been planned for January 20 at the Ambassador Hotel, Los Angeles.

The program calls for addresses on the business future, national and local taxes, material sources, supplies, demands, and prices, and panel discussions on agriculture, retailing, manufacturing, construction, motion pictures, and labor.

Conference sponsors include the California Society of Public Accountants, Society for the Advancement of Management, Realty Board, Advertising Club, Controllers Institute of America, Purchasing Agents, Downtown Business Men's, Credit Managers, Life Underwriters, and the American Statistical Associations.

Research Conference

The first annual Northern California Research Conference is scheduled for January 12, 1949, at the Palace Hotel, San Francisco. The conference will be sponsored by the San Francisco Chamber of Commerce, the University of California, Stanford University and Stanford Research Institute. Principal objective of the conference will be to acquaint northern California industrialists with scientific research facilities available in the area and to stimulate greater use of these facilities by industry.

CONTINENTAL DIVIDE

(Continued from page 79)

pistons, but our principal reason for moving from Chicago is so that we can expand our lines. That of course will mean that we will use more employees here. Our present production is 50,000 pistons a day, with six production lines. We will start in Pueblo with eight production lines, and we are planning to buy a half-million dollars worth of equipment to install in our new Pueblo plant.

Triplex will use 144,000 square feet of space at the Pueblo air base, which recently was taken over by the Pueblo Chamber of Commerce to provide facilities for industries seeking a home.

Casper Building Available

It is news when space of any kind shows up in the booming oil capital of the Rockies, Casper, Wyoming. However, we have learned that the Holscher Packing Company has a plant available on a long-term lease basis and is prepared to move out its meat packing equipment within a few weeks. The two-story building is of concrete, about 80 x 100 ft., containing about 16,000 square feet of floor space. Eight smaller buildings serve for storage and one is being used for living quarters. About six acres of land are included. The plant is at the end of town, with city water, 600 feet of railroad siding on the CB & Q, etc. Casper is the fastest-growing city in the Rocky Mountain region, and its Chamber of Commerce can tell you why.

Uranium Purchases

The Rifle, Colorado, plant of the United States Vanadium Corporation will offer to purchase uranium-bearing ores which are amenable to the Rifle process, from independent miners under provisions of a new three-year contract between the company and the U. S. Atomic Energy Commission. Up to this time the only ores processed at the Rifle plant have been from company-owned mines. As a result of the new contract, production at the Rifle plant is expected to be stepped up immediately and may perhaps be doubled. Uranium mines situated near the railroad in western Colorado and eastern Utah may find it economical to ship by rail to Rifle.

Huge Coal Reserves Shown in Survey

Montana has coal reserves of 387,000,000,000 tons, the second edition of a preliminary inventory of the state's mineral resources, issued by the Bureau of Mines and Geology, Montana School of Mines, reports.

The edition was presented by Francis A. Thompson, bureau director and Montana Mines president. U. M. Sahinen handled the revision. The report shows Montana's future mineral wealth will exceed that of the past.



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WESTERNERS AT WORK...

Arizona

Walter Lawson appointed general manager of the New Cornelia Branch of Phelps Dodge Corporation, Ajo, succeeding Ernest Whittenau, who retires after service with the corporation from 1915. Mr. Whittenau has been manager at New Cornelia since 1946 and supervised the \$500,000 Ajo improvement recently begun. Mr. Lawson has been assistant manager since last September.

California

Oil

Gage Lund elected a vice-president of Standard Oil Company of California. Mr. Lund became a director at Standard in January, 1948; is board chairman of The California Company and Standard Oil Company of Texas, both Standard of California subsidiaries operating in the Rocky Mountains, and of Richmond Exploration Co., Standard subsidiary, Venezuela. He joined Standard in 1925 as a geologist on graduation from Stanford.

A. E. Lacomble, president of Shell Development Company, with headquarters in San Francisco, elected chairman of the board, effective January 1, and will move to New York. M. E. Spaght, vice-president, becomes president and will move from New York to San Francisco. Shell Development is a research affiliate of Shell Union Oil Corporation.

Norman J. McGaw, vice-president, Shell Oil Co., San Francisco, elected to the board of directors, New York, where he will organize and direct a new department dealing with economic studies of the oil industry and with company planning and major developments.

E. S. Bodine assumes duties as manager, Shell Chemical plant, Los Angeles, succeeding Maarten Voogd, who goes to New York as assistant to the vice-president in charge of manufacturing. Mr. Bodine held that post in New York.

A. K. Brumbaugh, Jr., elevated to engineer of design for General Petroleum Corporation, Los Angeles, and will be in charge of new installations and improvements to the company's manufacturing plants and refineries.

Steel

Ralph W. Rager elected vice-president of Oil Well Supply Company, U. S. Steel subsidiary. Erwin P. Kraatz appointed controller.

Paul W. Cotton appointed management's representative at the South San Francisco plant of Bethlehem Pacific Coast Steel Corporation, in charge of industrial relations department. He started in operating department, Seattle, in 1938, and has been in the industrial relations department since 1943. George M. Bryson promoted to position of supervisor of piecework rating, San Francisco, transferring from chief rate setter, Los Angeles. He is a graduate of Whittier and has been with Bethlehem since 1935.

George B. McMeans appointed general superintendent of the Kaiser Steel plant, Fontana, succeeding C. H. Lenhart, resigned.

Earle V. Grover, president of Apex Steel Corporation, has been nominated for 1949 president of the Los Angeles Chamber of Commerce. Mr. Grover, a native of Denver, went to Los Angeles in 1904, became associated with the old Baker Iron Works in 1907, and joined Apex in 1929.

Robert L. Hartman appointed production manager of Hanford Foundry Co., San Bernardino. Mr. Hartman was associated with Utility Electric Steel Foundry for 14 years prior to joining Hanford. Edwin C. Relph, former production manager, has been named works manager.

Transportation

H. E. McNaught appointed manager of perishable freight traffic for Southern Pacific, succeeding G. F. Garland, who has gone into freight claims department.

United Air Lines announces a new engineering set-up under which four general managers will report directly to operations headquarters in Denver. W. C. Mentzer has been named general manager of engineering, and W. P. Hoare, general manager of the maintenance base at San Francisco, both with San Francisco headquarters. W. J. Addems will continue as general manager of flight operations, and S. V. Hall as general manager of ground services. Both will remain in Denver. J. A. Herlihy is vice-president, operations.

B. S. Sines elected president of Southern Pacific Railroad Company of Mexico, with headquarters in Guadalajara, Mexico, succeeding J. A. Small, retired.

George F. Squires, former assistant to the president, Pacific Electric Railway, Los Angeles, advanced to vice-president; T. L. Wagenbach, former general superintendent, appointed general manager.

Henry von Mörpurg appointed vice-president and director of Pacific Monorail System, Inc.

R. P. Ensign named manager of food service department, Western Air Lines, succeeding R. H. Moebus, resigned.

Electrical



E. S. Holt of Oakland appointed branch manager of the Emeryville plant of the Manufacturing and Repair Division, Westinghouse Electric Corporation.

Magnesium

Manley Brooks appointed foundry engineer for the Magnesium-Alloy Products Co., Compton. Formerly metallurgy instructor at Pennsylvania State College, also 30 years with Dow Chemical Co.

Miscellaneous

Harry Hunter appointed director of safety for the General Plant Protection Company, Los Angeles. Allen N. Sharp, manager of General Plant Protection Co., recently elected vice-president of California Private Investigators Ass'n.

Plastics

Burton S. Dake, Jr., is president; Beulah B. Lotz, vice-president, and C. L. Moore, secretary-treasurer, of Plastics, Inc., Pasadena, Calif., formerly Lester Molding Company.

Pipe



Thomas J. Lingle appointed Western Division manager in charge of manufacturing operations at the new Fontana, Calif., plant of Taylor Forge & Pipe Works, Chicago. He also will direct West Coast sales. Formerly associated with C. F. Braun Co., Alhambra, and since 1946 operated his own business.

Food

Frankie Albert, star pro football player and former Stanford All-American, joins public relations department, Golden State Co., Ltd., San Francisco. Will continue football affiliation.

California Packing Corporation, San Francisco, elects Ralph Brown, senior vice-president; William Herbert Carr, director, vice-president and member of the executive committee; R. G. Lucks and Willard C. Griffin, vice-presidents, and John K. Griffin and W. C. Glover, assistant comptrollers. Irving H. Granicher appointed general sales director.

Karl Jankowski, formerly with Wayne Mayhew & Co., named treasurer of Tri-Valley Packing Association, San Francisco, and Laurie Lehtin, formerly with Central States Co-op, Inc., Chicago, appointed secretary.

Manufacturing

Lee Cameron has been elected president and general manager of Superweld Corp., Glendale. Walter T. Wells, formerly president and general manager, named chairman of the board. He is also chairman of the board of Lane-Wells Company. S. S. Webster, Jr., CPA., named secretary, and Robert E. Jones, vice-president, also elected treasurer.

Hans A. Bohuslav appointed special engineering consultant to R. G. LeTourneau, president of R. G. LeTourneau, Inc., and will make his headquarters in Longview, Texas. He was formerly vice-president in charge of engineering and production with Engineering Controls, Inc., Los Angeles, and previously with Enterprise Engine & Foundry Co., San Francisco.

Lee Van Horn appointed chief process engineer for Fluor Corp., Ltd., with headquarters in Los Angeles, and will direct process research and engineering in connection with Fluor contracts in refining-plant construction.

William Vargo transfers from the main plant of Maas & Waldstein Co., manufacturers of lacquers, enamels and synthetics, Newark, N. J., to be in charge of the factory of Smith-Davis Co., Los Angeles division of M. & W. Francis K. Wilson becomes sales engineer to service San Francisco area customers.

Building Materials

Robert E. Bounds appointed staff engineer with the Insulations Division of The Paraffine Companies, Inc., with headquarters in San Francisco.

Aircraft

Harry W. Strangman, assistant treasurer of Douglas Aircraft Corp., Santa Monica, Calif., named treasurer and elected a director, succeeding Ralph V. Hunt, who resigned as vice-president, comptroller and director. H. P. Grube, treasurer contemplating semi-retirement, was elected assistant treasurer. Fred C. Fischer, director of industrial relations for Douglas, resigned to join Macy's, New York.

Maj. Gen. Oliver P. Echols, USAF, retired, becomes board chairman of Northrop Aircraft, Inc., on February 1. He will succeed Richard W. Millar, who is retiring.

Montana

Frederick Laist, vice-president in charge of metallurgical operations of the Anaconda Copper Mining Company in Montana and Idaho, transfers to New York headquarters.

J. A. Ramsay, formerly superintendent of Continental Oil Company's Wichita Falls, Texas, refinery, appointed superintendent of the new \$10,000,000 refinery now under construction at Billings.

Nevada

Arthur J. O'Connor appointed general superintendent of Consolidated Coppermines Corp., Kimberly, Nev., advancing from chief engineer. He succeeds the late Paul J. Sirkeglan.

D. Hargrove, mill superintendent, is now in charge of the Newmont Corporation's Deep Mines operation at Goldfield, Nev. He succeeds Joe Mihelich, construction superintendent, who has returned to Leadville, Colo.

New Mexico

John G. Reilly takes over duties of newly-created position of general manager of Bayard Department of United States Smelting, Refining and Mining Co., Bayard, N. M., assuming duties formerly handled by officials in Salt Lake City. He has been with the firm since 1921. L. H. Duriez continues as manager of the department and James Neuman as assistant.

Oregon

R. W. Pointer, president of Pointer-Willamette Co., retires from active management but remains as president and board chairman. He announces active management will be in charge of A. F. Muenchow, comptroller; E. B. Tongue, Jr., materials supervisor; G. D. Keerins, manager of trailer division and acting chief engineer; and Phil Grabinski, head of skyhook division. R. D. Batchelder is manager of a new parts division.

Hillman Lueddemann, vice-president and general manager of Pope & Talbot, lumber and shipping firm, and president of the Portland Chamber of Commerce, recently was honored by being named Portland's No. 1 citizen of 1948. Mr. Lueddemann won the honor for his work in advancing Portland's ranking as a seaport.

Albert Bauer, general manager of the Kaiser ship repair and home building interests in the Portland area, is the new president of the Portland Chamber of Commerce.

Marvin C. Jones to be manager of Weyerhaeuser Timber Company's sulphate pulp and container board plant mill at Springfield, Ore. Comes from Michigan Carton Company, Battle Creek.

(Continued on page 84)

MATERIAL HANDLING News

When a thorough study of their materials handling and shipping methods revealed many opportunities for substantial savings, The Coleman Company, Inc., appliance manufacturers of Wichita, Kansas, installed a completely mechanized handling system planned around the Clark PUL-PAC.

The survey disclosed a conspicuous need for an efficient method of moving Coleman appliances—lanterns, camp stoves and other small items—from production to "live" storage, 1200 feet distant; for storing them in critically limited space and moving them thence to rail cars and motor trucks for shipment. Under the old system, this required as many as five individual handlings. Under the new method, the various items as they come from packaging



Clark PUL-PAC tiers a load of 98 lanterns at the Coleman Company, Inc., Wichita, Kansas.

machines are assembled in unit loads on trailers, utilizing 44" x 48" fiber sheets as load bases. Industrial tractors haul the trailers to the shipping department where the Clark PUL-PAC removes the unit loads from the trailers and tiers them in temporary storage. Finally, the PUL-PAC transfers the loads to the shipping department for order assembly.

Immediate benefits achieved through the new method were elimination of three to five handlings with comparably less damage to merchandise; a new and "highly satisfactory" shipping system; multiplication of available storage space through use of "air rights."

There may be similar undiscovered opportunities for important savings in your plant. It costs nothing to discover them if you Consult Clark.

Eliminated
3 to 5
INDIVIDUAL
HANDLINGS

Reduced
HANDLING
COSTS

Cut
DAMAGE
LOSSES

Saved
STORAGE
SPACE

APPLIANCE MANUFACTURER
ACHIEVED ALL THESE BENEFITS
BY INSTALLING THE CLARK

PUL-PAC

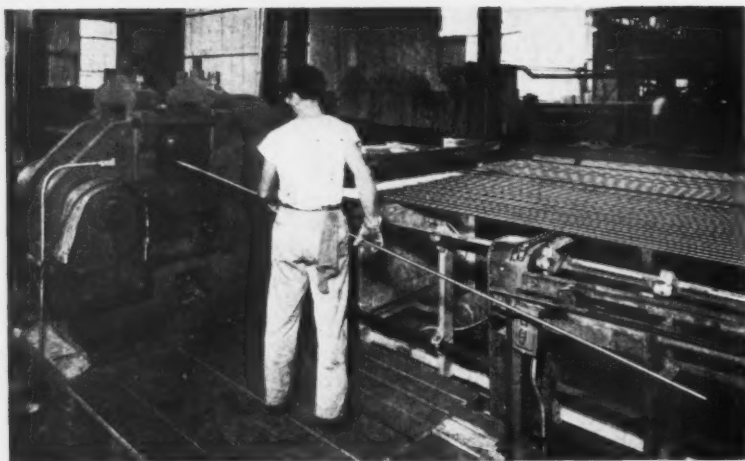


Clark PUL-PAC unloading trailer for warehouse storage.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS



INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT COMPANY BATTLE CREEK 28, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS



Automatically controlled continuous type gas-fired furnaces are featured in the coil spring production line at United States Spring & Bumper Co., Vernon, California. From hot rolling of rod tips to final paint drying (both illustrated), the flexibility of gas meets each heating requirement exactly. From dryer, springs go directly to packers for shipment.



To supply the demand for coil springs in California automobile plants, United States Spring & Bumper Co. has launched an "all-western" operation.

Western steel is fabricated for western use with the aid of western natural gas—using western-designed and installed equipment!

All the heating operations (hot-rolling ends, coiling, hardening, drawing, and paint baking) are accomplished with specially designed gas-fired equipment.

Whatever your heat problems, your gas company's industrial engineers can help you solve them—with profit to you. Inquire about the newer industrial applications of...

GAS

PACIFIC COAST GAS ASSOCIATION

WESTERNERS AT WORK

(Continued from page 83)

Utah



Wallace F. Bennett of Salt Lake City is the 1949 president of the National Association of Manufacturers. Mr. Bennett is president of Bennett's, successor to Bennett Glass & Paint Co.; president of Bennett Motor Co.; director, Zion's Savings Bank & Trust Co.; vice-president, Clayton Investment Co.; president, Cardon Jewelry Co.,

Logan, Utah, and a director of Utah Home Fire Insurance Company and Utah Oil Refining Co. Mr. Bennett is the first manufacturer west of Chicago to be selected for the presidency. He said his selection "is a recognition of the growing importance of Western industry."

Washington

B. H. Sloane named production superintendent and C. T. Heins, assistant production superintendent, at the Vancouver, Wash., plant of the Aluminum Company of America.

Charles M. Kinghorn appointed to direct the new roll-forming facilities of the Permanent Metals Corporation's Trentwood mill, near Spokane. He has been vice-president and chief engineer of the Cresswell Roll Forming Company, Montreal.

C. C. Spears of Portland succeeds Verne Hayes, Seattle, as president of Coast Oyster Company. Hayes, vice-president of Willapoint Oyster Co., an affiliate, will devote entire time to production for both companies.

Fred C. Rummell, president of Burr & Co., New York, elected president of Spokane International Railroad, succeeding E. S. McPherson, deceased.

Promotions and new appointments to the engineering production staff of Boeing Airplane Co., Seattle, include: George C. Martin, advanced to chief project engineer for XB-47 Stratojet bomber project; Maynard L. Pennell succeeds to Martin's former position as chief of preliminary design; W. W. Rutledge, first assistant to manufacturing vice-president, becomes production manager; Robert M. Robbins, test pilot, appointed assistant project engineer; C. E. Rutledge appointed cost engineer, succeeding L. L. Pierce; Pierce and Albert H. Webber named assistant Stratojet project engineers; R. H. McElroy advanced to chief of C-97 Stratofreighter project, and C. B. Gracey appointed to special-assignment duties.

Wyoming

D. C. Baker of Casper, district superintendent at Casper since September 1, 1948, promoted to superintendent of drilling and production, Rocky Mountain division, The Texas Company. He joined the firm in 1928 and has served in the Pondera, Cut Bank and Kevin-Sunburst oil fields of Montana.

Associations Elect

Appointed the newly-organized Petroleum Industries Committee of the Western Oil and Gas Association, Los Angeles, were: Wallace E. Avery, Texas Company; C. S. Beesmyer, General Petroleum; W. J. DeMartini, Richfield Oil; L. A. Gibbons, Union Oil; Harrison Guio, Tide Water Associated; Sigvald Nielson, Standard Oil; and F. F. Thomas, Jr., Shell Oil. This committee succeeds the Pacific Coast Petroleum Industries Committee which has been dissolved as an independent entity. The primary function of the new committee will be to work

on matters relating to highway finances, particularly gasoline taxes.

G. Stewart Brown of the Standard Oil Company of California appointed a vice-chairman of the Oil Industry Information Committee at the Chicago meeting.

J. B. Banning, Jr., assistant freight traffic manager, Matson Navigation Co., is the new president of the Los Angeles Steamship Association, succeeding W. A. St. Amant, manager of W. R. Grace & Company. W. B. Bryant, district manager, General Steamship Corp., Ltd., Los Angeles, named vice-president. Re-elected secretary-treasurer was Harry R. Door, resident manager, Norton, Lilly & Co., and Miss Margaret Mridges, assistant secretary.

H. J. Barnes of Kaysville is the new president of the Utah Manufacturers Association. He is secretary-treasurer of the Kaysville Canning Corp., and is interested in banking and farming.

A. I. Levorsen, dean of the Stanford School of Mineral Sciences, is the first president of the new American Geological Institute.

Dr. John G. Meiler, Plywood Research Laboratory, Tacoma, appointed secretary-treasurer of the Pacific Northwest Plastics Association, succeeding Leo Livingston, resigned.

Sherman A. Bishop appointed general manager of California Redwood Association, succeeding Kenneth Smith, who resigned to join the Pacific Lumber Company, San Francisco.

William E. Geer re-elected president of the Manufacturers' Association of Colorado. Mr. Geer is secretary and general manager of the Midwest Steel & Iron Works Company. Other officers are: Robert M. Pease, Colorado Milling & Elevator Company, vice-president; George F. Andrist, Mountain States Telephone & Telegraph Company, treasurer; and L. H. Kittell, secretary-manager.

Paul Hirth, division manager of Continental Oil Company, Denver, Colo., is the new chairman of the Rocky Mountain Oil Industry Information Committee, succeeding M. H. Robineau, president, Frontier Refining Company, Denver.

Glenn E. Nielson, Cody, Wyo., new president of the Rocky Mountain Oil and Gas Association. H. A. Stewart, Denver, outgoing president. Other new officers are J. F. Cullen, Casper, Wyo., first vice-president; C. S. Hill, Denver, second vice-president; R. S. Curren, Casper, third vice-president; C. J. Mueller, Denver, treasurer.

N. H. Angell, mgr. asphalt division, Standard Oil Company of California, elected president Asphalt Institute and chairman of the institute's executive committee.

Officers for 1949 of the Columbia section, American Institute of Mining and Metallurgical Engineers: C. Y. Garber, Kellogg, Idaho, chairman; Howard P. Sherman, Spokane, and Joseph A. Mecia, Patterson, Idaho, vice-chairmen; L. A. Grant, Wallace, secretary-treasurer, and Harold Kirkemo, Spokane, and Harry W. Marsh, Boise, assistant secretaries.

Henry G. Watson, city engineer of Cheyenne, Wyo., appointed Wyoming state chairman of the American Public Works Association.

Arizona Section of the American Institute of Mining and Metallurgical Engineers has re-elected top officials to office at the annual meeting in Tucson, Ariz., as follows: P. D. I. Hon-eyman, Inspiration, chairman; Albert Mendelsohn, Cananea, Sonora, first vice-chairman; Wesley P. Goss, Superior, second vice-chairman, and B. J. Messer, Miami, secretary-treasurer. The group also chose 1949 directors.

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THE WEST ON ITS WAY

ARIZONA

EXPLORATORY WELL STARTED—General Petroleum Corporation began actual drilling operations on the firm's first exploratory well northwest of Holbrook, Ariz., in mid-December. The company announced the area as virgin territory as far as oil well drilling is concerned.

CALIFORNIA

KOEHRING BUYS STOCKTON PLANT—The Koehring Co., Milwaukee, manufacturers of heavy-duty construction equipment, has purchased the West Coast Machinery Company plant at 2200 Country Club Blvd., Stockton. Operation was scheduled to start January 2, according to W. J. Duecker, manager. The plant will be a distribution center and manufacturing unit. Exports will be handled through the Port of Stockton.

WEST COAST MACHINERY TO BUILD—West Coast Machinery Co., Stockton, is building a new plant in Stockton after selling its former site to Koehring. The West Coast Machinery Company manufactures agricultural implements and industrial equipment. The new address will be 1801 E. Charter Way, Stockton. S. C. Ryland is manager.

CARNATION EXPANDS PLANT—Carnation Milk Co., 540 N. Aurora St., Stockton, is expanding its plant and will increase the number of workers, according to E. P. Gillespie, manager.

\$1,000,000 LABORATORY OPENED—California Research Corp., a Standard Oil Company of California subsidiary, recently opened a \$1,000,000 oil field research laboratory at La Habra, Calif. E. G. Gaylord, vice-president of California Research, and R. F. Faull, head of the oil research center, greeted some 500 visitors at dedication ceremonies. Among studies to be undertaken are the determination of the physical behavior of oil and gas under pressure and temperature conditions existing in underground reservoirs and how oil, gas and water move through rocks.

DOUGLAS WINS CONTRACT—Douglas Aircraft Company, Santa Monica, will build a 16-foot section of fuselage for the Air Force's four-engined B-50 bomber under a sub-contract with Boeing Airplane Company. Douglas was successful bidder on a contract to build more than 200 units of the fuselage section at a cost of approximately \$3,500,000. The B-50 project will provide employment for 250 shop workers during peak production extending through 1949.

SHIP REPAIR FIRM PURCHASED—Commercial Ship Repair, Seattle, is the new owner of the Maritime Engineering and Ship Repair Co., Inc., San Francisco, marking the former firm's third expansion since last December and giving it coastwide operation. Eddie Black and James Featherstone are owners of Commercial Repair. San Francisco personnel will include H. A. Cammann as general manager of the new yard; Fred Finn, general superintendent; J. R. Featherstone, assistant manager, and Mrs. Mabel Monson, office manager and head accountant. Commercial Repair has plants in Seattle and Tacoma besides the new San Francisco acquisition.

\$126,595,000 IN PROJECTS APPROVED—Pacific Gas & Electric Company was authorized December 1 by the California Public Utilities Commission to make power plant improvements to cost \$126,595,000. The plant at Kern will add 100,000 kw. and will cost in excess of \$13,000,000; the Moss Landing project near Monterey Bay will add 300,000 kw. and will cost approximately \$57,000,000, and the Antioch plant will add 300,000 kw. at a cost of \$56,000,000. The improvements will increase total power production capacity by 128 per cent by August, 1951.

MILLING PLANT BOUGHT—Purchase of the Reliance Milling Co., Norwalk, for more than \$500,000 cash, is announced by Adolph Weinberg, head of the Coast Grain Co., Norwalk.

INCINERATOR PLANNED—Los Angeles By-Products Co., Los Angeles, will construct a \$150,000 incinerator and combustion chamber guaranteed to comply with air pollution regulations, C. M. Gregg, president, informed the Air Pollution Control Board.

\$1,000,000 FOOD PLANT—Fontana Food Products, a division of Hunt Foods, Inc., will build a new \$1,000,000 plant on West A Street, Hayward, Calif., to replace and expand the burned-out South San Francisco plant.

\$500,000 DISTILLATION TOWER—General Petroleum Corporation has completed construction of a new \$500,000 distillation tower at the Torrance, Calif., refinery which will make possible the production of more gasoline from each barrel of crude over ordinary distillation methods. The new tower will produce 12,000 additional barrels of gas-oil daily and approximately 50 per cent of it will be turned into gasoline.

\$750,000 GRAYBAR WAREHOUSE—Graybar Electric Company announces plans to construct a new \$750,000 three-story office and warehouse building on Alameda St., between De Haro and Rhode Island streets, San Francisco.

HERCULES WILL EXPAND—Hercules Powder Company announces plans to invest more than \$1,000,000 in addition to the ammonia and ammonium nitrate plants at Hercules, Calif. The new facilities will produce anhydrous ammonia and ammonium nitrate. Bechtel Corporation, San Francisco, has been awarded the general construction contract. Work is scheduled for completion in from 10 to 12 months.

HYCON INTEREST ACQUIRED—Millard H. Pryor, president of Pryor Manufacturing Company and Barnes Manufacturing Company in Mansfield, Ohio, announces acquisition of majority ownership interest in the Hycon Manufacturing Co., Pasadena. Active head of Hycon (formerly Hydra-Control Company) is Alden E. Acker, vice-president and general manager; directorship will now include Pryor, Trevor Gardner and Orrin Fox. Firm handles aircraft hydraulics, special photographic equipment, and experimental ordnance units.

SECOND BLAST FURNACE APPROVED—Plans of the Kaiser Company for a \$17,000,000 second blast furnace and by-products coke plant at Fontana have been approved by the San Bernardino County Board of Supervisors. The application was signed by J. L. Ashby, vice-president of Kaiser Company. Attorney Donald W. Jordan told the supervisors that the company is taking special precautions for the protection of citrus groves in the area. The addition will employ 400 more men and step up the plant's pig iron production from 1,200 to 2,000 tons daily.

\$150,000 WAREHOUSE PLANNED—Wilson & Geo. Meyer & Co., Pacific Coast distributors of agricultural and industrial chemicals, is constructing a \$150,000 warehouse and office building in the Los Angeles central manufacturing district to serve customers in southern California, Arizona, Utah, Colorado and New Mexico. It will contain 10,200 square feet of floor space. Vice-president Tom W. Harris supervises southern California activities and Tom H. Lathe manages Southwest agricultural chemical sales. Wilson Meyer is president with headquarters in San Francisco. The firm has additional offices and warehouses in Portland and Seattle.

\$900,000 CONTRACT LET—Contract for construction of the hardwood manufacturing plant of the Masonite Corporation, Chicago, to be erected at Ukiah, Calif., has been let to Barret & Hilp, San Francisco. Estimated cost of the work is in excess of \$900,000. The factory is expected to be completed by June, 1949.

\$100,000 ASPHALT PLANT—Clements & Company are building a new factory at Centerville, Calif., for the production of asphalt. The expenditure will approximate \$100,000.

REDWOOD CITY PLANT—A new plant in the San Francisco Bay area is that of Blue Ox Industries at Redwood City. The firm fabricates Post formed decorative and industrial plastics.

AEROL COMPANY PURCHASED—Airquipment Company announces purchase of Aerol Co., Inc., Los Angeles, manufacturers of materials handling equipment and developers of Aerol-Seal watertight wheels used by the packing industry. Aerol Company will continue as a separate entity as a subsidiary of Airquipment, manufacturers and marketers of aircraft ground handling equipment. Frank Gaines, founder of Aerol, remains as an active participant in development of Aerol products. Airquipment is a wholly-owned subsidiary of Lockheed Aircraft Corp.

ALUMINEX INCORPORATED—J. Royden Estey & Sons announce formation of Aluminex Incorporated to succeed them in the manufacture and distribution of Aluminex skylights and associated products. Offices and plant are at 2993 Allesandro St., Los Angeles.

COLORADO

OIL STRIKE IN COLORADO—An oil strike in the Dove Creek structure of Montezuma county, 25 miles northwest of Cortez, Colo., is giving impetus to oil activity in the four-state area of southwest Colorado, New Mexico, Arizona and Utah. The new well, drilled by Byrd-Frost, Inc., and Western Natural Gas Company, may open the first major oil field in Colorado since Rangely. Harold Byrd, Dallas, Texas, reported present plans call for 15 new wells to be drilled and also for construction of a pipeline for natural gas to Salt Lake City and San Francisco.

OIL BULK PLANT—Construction of a new wholesale marketing warehouse and bulk plant is planned for Denver by Carter Oil Company at

a cost of \$220,000, C. D. Hill, division sales manager, announces. The company has acquired 13 acres between Forest and Holly streets, adjacent to the Union Pacific railroad.

REFINERY EXPANSION COMPLETED—Continental Oil Company has completed an \$8,500,000 program for expansion and modernization of the Denver refinery.

IDAHO

SECOND PLANT WELL UP—Gates Bros. Company, Wendell, reports the phosphoric acid manufacturing building at the Wendell fertilizer plant is well under way. Charles T. Gates, president, said acid production at the plant will enable the company to produce 100 tons of treble-super phosphate per day.

SMELTER BUILDING ERECTED—Bradley Mining Company reports the main building now up at its \$1,000,000 antimony smelter at Stibnite, Idaho. The smelter is expected to be ready for operation in about a year.

MONTANA

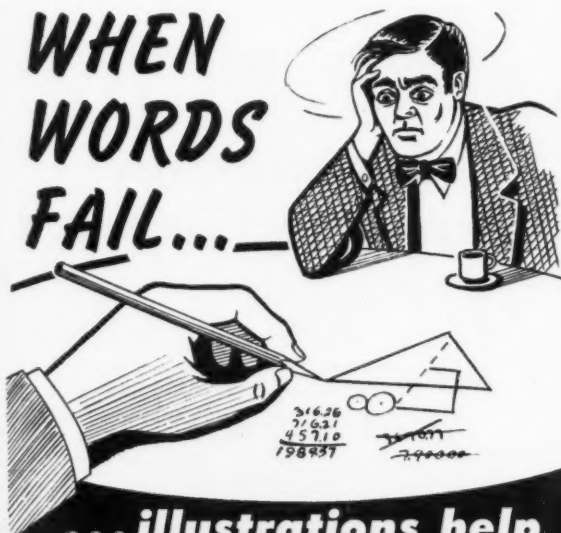
RAILWAY PLANS TREE FARM—The Great Northern Railway will establish a 75,000-acre tree farm on cut-over lands owned by the Somers Lumber Company in the Flathead Lake region in Montana, according to F. J. Gavin, president of the railway. The Somers company is a subsidiary of the railway. The tree farm will provide future requirements for track ties. Sawmill operations in Somers, Mont., will be terminated Mr. Gavin said, but the tie-treating plant will continue.

CARTER OIL TO BUILD—Carter Oil Company has announced plans to construct a new wholesale marketing warehouse and bulk plant near the firm's new refinery east of Billings, Mont. Plans have been approved by the company's main offices in Tulsa, Okla., according to G. W. Menke, division sales manager.

DERBY OIL FILES—Derby Oil Co., Wichita, Kan., has been authorized by the secretary of state to do business in Montana. The firm is capitalized at \$8,000,000 and is represented in Montana by E. G. Toomey of Helena.

(Continued on page 88)

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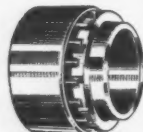
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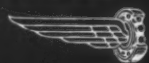
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THE WEST ON ITS WAY

(Continued from page 87)

NEVADA

TOOL COMPANY ORGANIZES—The Pioneer Power Tool Company of Las Vegas listed a capital stock of \$100,000. Incorporators include Howard Crawford, William Patterson and Norbert O. C. Miller, all of Las Vegas.

REDUCTION PLANT OPERATING—Newmont Mining Corporation's new Goldfield, Nev., reduction plant is now operating on stock-piled gold ore.

NEW MEXICO

POWER PROJECT PROPOSED—Authorization by Congress of a hydro-electric development for the proposed Middle Rio Grande flood control reclamation project will be asked by Clinton Anderson, Democratic senator-elect, he said in Albuquerque.

FLUORSPAR MILL SOLD—The Barnett Company of Denver has purchased the surplus Gila Fluorspar Mill at Gila, N. M., from the War Assets Administration, outbidding three others seeking the plant with an offer of \$27,116, according to J. A. Skeen, regional director.

OREGON

\$1,500,000 MODERNIZATION STARTS—St. Helens Pulp & Paper Company, St. Helens, Ore., has underway a \$1,500,000 improvement program designed to modernize the 23-year-old plant, according to Max Oberdorfer, president. The plant is the largest industry in Columbia county, Oregon.

CONTINENTAL PLANT PURCHASED—Continental Can Company's plant in Portland, Ore., has been purchased by the New York Life Insurance Company and has been leased to the seller in the third such deal completed under a 1946 agreement. The price was not disclosed.

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MILLION-DOLLAR EXPANSION — The Blitz Weinhard Company completes a two-year, \$1,000,000 expansion program of its Portland, Ore., facilities, which makes this plant one of the four largest breweries in the nation.

\$550,000 OFFICE BUILDING—Plans are announced for a two-story reinforced concrete office building to be erected for the Lloyd Corporation for lease to the Bonneville Power Administration at an estimated \$550,000 cost.

POWER PLANT EXPANSION—Capacity of the Lincoln Station generating plant of the Pacific Power & Light Company, Portland, is to be increased by extensive boiler reconstruction at an estimated cost of \$286,000.

PACKING COMPANY PURCHASED—The Columbia River Salmon Co., Inc., Astoria, has been sold to Superior Packing Co., Seattle and Tenakke, Alaska. New president will be John T. Tenneson, Sr., while John T. Tenneson, Jr., will be secretary and eventually will move to Astoria to direct the company. Arthur Anderson, Jr., will continue to supervise operations at Astoria.

UTAH

NEW \$11,000,000 POWER PLANT—Utah Power & Light Company announces that the projected new \$11,000,000 steam-electric generating plant will be located as an addition to the present Jordan Street plant in Salt Lake City. Construction is expected to start in 1949 and the new 63,000 kilowatt plant is scheduled to go into production in 1951. Utah Power is purchasing 26 acres adjacent to the present plant for the addition, according to George M. Gadsby, UP&L president. The Jordan Street plant now has an installed capacity of 45,000 kilowatts. The new plant is part of Utah Power's \$61,000,000 five-year development program.

PLANT READY IN APRIL—The new two-acre plant of Zellerbach Paper Company in Salt Lake City is expected to be ready for occupancy by April of 1949. The plant is being constructed by Bowers Building Company and will cost between \$300,000 and \$500,000, according to E. A. Breyman, San Francisco, vice-president in charge of general operations for Zellerbach.

PIPING GAS FROM WYOMING—Natural gas is now being piped by Mountain Fuel Supply Company from the Church Buttes field in western Wyoming to consumers in the Salt Lake City and Ogden areas. The completion of a \$100,000 dehydration and separation plant in Wyoming has made possible the piping of the gas to Utah.

(Continued on page 90)

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A super grease type lubricant! A marvelous anti-seize compound and a real protector against rust and corrosion. From the standpoint of general utility and diversity of important uses, LUBRIPLATE 130-AA is unequalled. While it is ideal for the heaviest loads, this remarkable lubricant does not cause drag and actually conserves power. Write for a free copy of the LUBRIPLATE Service Hand Book.

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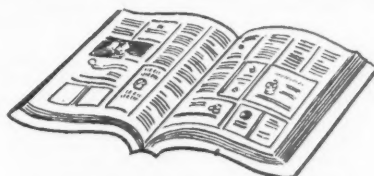
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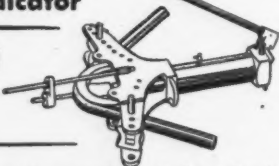




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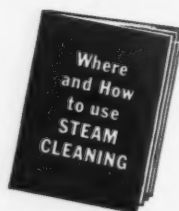
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THE WEST ON ITS WAY

(Continued from page 89)

UTAH SURVEYS PLANNED—General Petroleum Corporation, Los Angeles, plans to establish a land office in Utah and will conduct geological surveys in the state at an early date, Wallace B. Curtis, director of public relations for the oil company, reported in Salt Lake City.

POWER LINE PLANNED—Construction of a 44,000-volt power line from the Oneida power plant in Preston Valley to Bear Lake Valley is planned at an early date.

GILSONITE PLANT TO BE BUILT—Construction of a \$200,000 to \$300,000 plant is planned at Bonanza, Utah, to dissolve gilsonite in Rangely crude oil for transportation through the new Salt Lake-Rangely pipeline, according to E. F. Goodner, executive vice-president of the American Gilsonite Company. The dissolved gilsonite would then be processed at the Salt Lake Refining Company's plant in the same way as crude oil.

WASHINGTON

GENERATOR CONTRACT LET—Contract for four generators at the powerhouse of McNary Dam now being constructed across the Columbia River has been let to the General Electric Company on a bid of \$7,302,674, Col. William Whipple, Army engineer for the Walla Walla district, recently announced. The date of April 1, 1954, has been set for first production of electric power from the McNary project.

KRAFT MILL NOW OPERATING—Weyerhaeuser Timber Company's new kraft pulp mill which will utilize wood recovered from three lumber mills and a plywood plant is now operating at the company's manufacturing center at Longview. Newest improved apparatus to produce high quality and uniform pulp has been installed in 12 buildings with more than 200,000 square feet of space. The kraft mill adds to the company's pulp production facilities which include sulphite mills at Longview and Everett. The company also has a kraft mill and container board plant under construction at Springfield, Ore., which is scheduled for operation in 1949.

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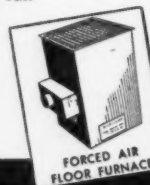
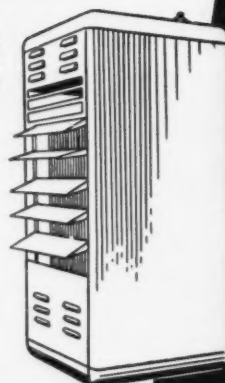
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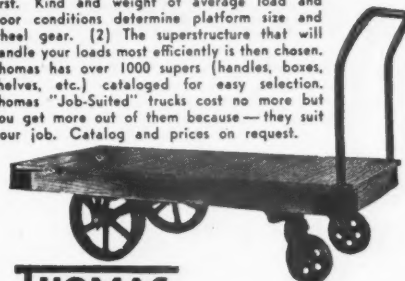
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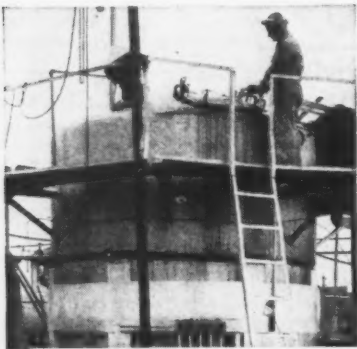
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(PHOTO COURTESY ARISTO CORPORATION)

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You may profit from the experience of the Aristo Corporation of Detroit. In their process for esterifying vegetable oils, raw materials are cooked at 400° F. or higher. When these temperatures were maintained, however, as much as half of the entire batch was occasionally lost by foaming. Since these foams are flammable, continuous cooking at 400° F. was also extremely hazardous.

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WESTERN TRADE WINDS

NEWS ABOUT THOSE WHO DISTRIBUTE AND SELL INDUSTRIAL EQUIPMENT AND MATERIALS

Edward C. La Bart appointed assistant district manager of the Seattle, Wash., warehouse of United States Steel Supply Company, and George R. Coffin named assistant district manager at the company's Portland, Ore., warehouse. Mr. La Bart transfers from Los Angeles and Mr. Coffin from service in Chicago and San Francisco.

Morris (Mike) Rhine appointed assistant to Pacific District Manager Allen G. Jones of General Electric's Apparatus Department and in this newly-created position will be special consultant and counselor on major sale negotiations in California, Arizona and western Nevada. Kurt Steindorff appointed to newly-created position of manager of San Francisco office of Apparatus Department, and will cover the commercial, engineering and service sections in northern California, western Nevada and Hawaiian Islands. Samuel G. Gearhart named manager of Industrial Division, San Francisco office, with responsibility for sales activities of the division in northern California, western Nevada and Hawaiian Islands. E. S. Bjonerud appointed manager of Resale Section of Industrial Division, San Francisco office. Herbert C. Bosch named manager of Oakland sales office.

Alexander S. Moody, commercial vice-president of General Electric Company in charge of customer relations work in the Northwestern states, with headquarters in Portland, Ore., retires after 42 years' service.

Westinghouse Electric Corporation completes another step in Western expansion with opening of new Salt Lake City headquarters serving the Intermountain area. Offices, warehouse and shop repair facilities occupy 20,400 square feet of space at 235 W. South Temple Street. The newly-remodeled structure was formerly Salt Lake City headquarters for Westinghouse Electric Supply Company and is equipped to handle jobs formerly sent to the Pacific Coast or Middle West.

J. C. Belloni appointed Pacific Coast District order service manager for Westinghouse Electric Corporation, San Francisco. Mr. Belloni joined the firm in 1931 at San Francisco.

C. E. Graves, district manager for Du Pont Company, Tacoma, takes charge of new Pacific Coast agricultural chemical sales organization of the Grasselli Chemicals Dept., to be opened at San Francisco January 1 when the Tacoma office is closed. Cosby C. James will head a new branch office at Yakima, Wash., for agricultural sales.

C. J. Moran assigned to Western division, Los Angeles, for Mack-International Motor Truck Corporation, in charge of national account sales and sales of heavy-duty off-highway vehicles.

Luther L. Smith appointed Southern California district sales manager for Smith-Blair, Inc., manufacturers of waterworks specialties. The new Smith-Blair headquarters are located at 3170 State Street, San Bernardino, where service and stocks are available for southern counties except Los Angeles.

C. H. Hallett appointed manager of sales for the Los Angeles plant of Joseph T. Ryerson & Son, Inc., steel distributors. He became associated with Ryerson in 1941 after previous experience in practically all phases of steel mill operations, serving Ryerson first at Buffalo and Chicago and then transferring to Los Angeles in 1948. He is a graduate of Northwestern and a veteran of World War II.



C. H. Hallett

Jack Seligman becomes head of the candy division of Granny Goose Foods, Oakland, Calif. He was formerly general manager of Blum's.

Ed Superka, formerly with Anchor Hocking Glass Corp., Chicago, transfers to San Francisco offices of the firm.

Perry Kilsby announces reorganization of his company and change in name from Kilsby-Harmon, Inc., to Perry Kilsby, Inc. President Kilsby announced enlargement of the sales department under C. L. Brown, vice-president, and the warehouse under the new company manager, R. R. Lawson. The firm specializes in steel tubular products and will continue to serve Western industry from Los Angeles headquarters and offices in San Francisco and Seattle.

Cerro de Pasco Copper Corp., New York City, announces appointment of Peck Steel and Die Supply, 4436 Long Beach Ave., Los Angeles, of which Anton Peck is proprietor, as West Coast distributor of Cerro low-temperature-melting alloys.

Twin Disc Clutch Co., Racine, Wis., announces increased service facilities with construction of a new Seattle branch sales engineering office, 1214 Westlake Ave., North, Seattle. The firm recently opened similar new facilities at Los Angeles. All West Coast operations are under direction of A. E. Young, West Coast district manager. Paul W. Wahler is assistant district manager in charge of the Seattle office.



Tri-State Supply Corporations has purchased an additional 9,000 square feet of land adjoining their property at 544 S. San Pedro Street, Los Angeles, in the tenth expansion in 15 years, according to C. F. Bowers, president.

Edward A. Altshuler appointed Western manager for Prest-Glass Corporation, New York, which is establishing a Western manufacturing and sales center in southern California to handle the firm's new fibreglass product, "Prest-Glass."

Air Reduction Pacific Company is offering reprint of article on Heliwelding entitled, "How to Use Helium Shielded Arc Welding," written by H. O. Jones, welding specialist. Requests for free copy should be directed to nearest Airco Pacific office.

Bearing Engineering and Sales Co., Salt Lake City, appointed distributor of Torrington anti-friction bearings by The Torrington Co., Torrington, Conn., and South Bend, Ind. Claude Middleton is president; A. O. Arnett, secretary-treasurer, of Bearing Engineering. They are distributors in Utah, Nevada, southern Idaho and southwest Wyoming.

Colorado Bearing Co., Denver, appointed distributor of Torrington anti-friction bearings in Colorado, southeast Wyoming and western Nebraska. R. C. Graham and W. J. Gallatin, partners.

Lily Tulip Cup Corp., New York City, recently moved Pacific Division headquarters and personnel to 2532 E. 49th St. (Vernon), Los Angeles. Sales and distribution for southern California and Arizona will be handled from the new location. W. R. Lenderking, vice-president, Pacific operations, will maintain headquarters at the new address. He was vice-president in charge of sales, New York, from formation of the corporation in 1929 until creation of Pacific Division at the end of the last war. The Pacific Manufacturing Division continues at 3050 E. 11th St., Los Angeles, Paul R. Raab, general manager. Matthew A. Oliver, Jr., is Northern Pacific Division sales manager, San Francisco; and Anthony G. Rodgers, district manager, Seattle.

W. G. Lee appointed sales engineer for special accounts in the General Electric's Oakland, Calif., sales and engineering offices. He has been fractional horsepower motor specialist in San Francisco since 1929.

Columbia Steel Company announced appointment of Perry Kilsby, Inc., Los Angeles, as distributor for Shelby Seamless Tubing manufactured by National Tube Company and marketed by Columbia on the Pacific Coast. The new distributor will handle tubing in all carbon, alloy, and stainless analyses, hot finished and cold drawn for all types of applications.

Hans Erlanger named general sales manager of Hunt Foods, Inc., with headquarters in Los Angeles.

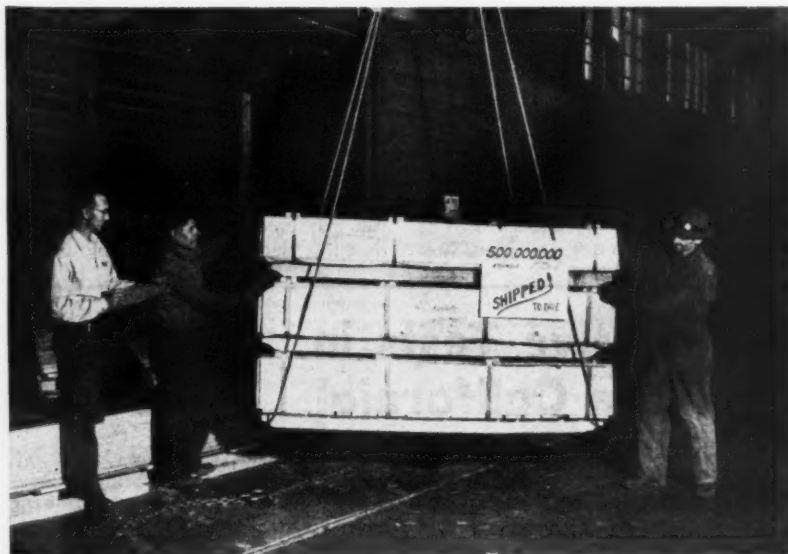
Daniel W. Seagrave, superintendent of service and erection of Allis-Chalmers Seattle district office, named service manager of the company's Pacific Region, with offices to be located eventually in San Francisco. Mr. Seagrave has been with Allis-Chalmers for 37 years and has been at Seattle since 1940.

Richards Machine Tool Co., manufacturers of "Rimat" machine tools and micrometers, will hereafter be known as Rimat Machine Tool Co., and the firm occupies larger quarters, at 1117 Air Way, Glendale, Calif. James H. Richards is general mgr. Karl M. Joehnick has been named sales manager. He was formerly with General Electric, Manufacturers Chemical Corp., and Koppers Co., Inc.



Karl M. Joehnick

Burroughs Adding Machine Co., Detroit, Mich., recently opened a new southern California branch building at 1649 Wilshire Blvd., Los Angeles, "to serve the growing market in this area," L. V. Britt, board chairman, announced. Accompanying Mr. Britt at opening ceremonies were Harold S. Chase, executive committeeman and company director, of Santa Barbara, and G. H. Parrish, head of the new Los Angeles branch.



Workmen handle 500,000,000th pound of aluminum to be rolled by Permanente Metals Corporation at the big Kaiser Aluminum rolling mill at Trentwood, near Spokane, Wash., in 858 days of continuous operation. The first order was shipped in July, 1946.

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New Records Set in Western Pine Region

By ROBERT O. LEONARD
Western Pine Association

PRODUCTION of Western Pine Region lumber will hit an estimated total of slightly more than 7 billion board feet in 1948, early fourth quarter trends indicated in mid-November. A record figure, it will be matched by shipments of approximately 6¾ billion feet, also a new mark in Western Pine history.

Each of the two figures will exceed the record volume of 1947 by some 250 million feet. Production last year reached 6,729 million and shipments 6,552 million.

Production performance for 1949 is a good deal more difficult—and less fashionable—to predict than it was a year ago for 1948. It depends, of course, directly upon the health of the construction industry and that, in turn depends upon a number of factors not the least of which is the direction the 81st Congress will take. If, as some trade reports indicate, the saturation point in \$12,000 and up dwellings has been reached or is in sight, the future will lie in the solution of the low income group housing problem. And if, through private industry or government action, a method is found to handle it, the construction business will obviously benefit and so, perforce will the Western Pine industry.

In any event, Western Pine production will follow generally the rise or fall of building in 1949.

Demand for the three Western Pines—Idaho White Pine, Ponderosa Pine, and Sugar Pine—and associated species has shown no significant trend toward or away from customary areas of use. California remains the largest single state destination of shipments, ranging year in and year out at approximately 25 per cent. Oregon is traditionally second, taking some nine per cent of total shipments. The midwest farm states constitute one of the biggest destination areas of the Western Pines. About 25 per cent of shipments go to Illinois, Iowa, Minnesota, Michigan, Wis-

consin, and Ohio. The eastern seaboard states are heavy buyers and the state of Washington usually accounts for about seven per cent. Shipments in some amount annually go into all 48 states. Foreign shipments rarely total more than one per cent.

Shipments of lumber ultimately destined for general construction in 1948 showed no trend in types since all types—shop, common, dimension, and finish lumber—are used in building. Shop lumber, as usual, was heavily purchased by midwestern woodwork plants for processing into sash, doors, mouldings, and other interior trim.

Shipments by species showed white fir—one of the associated species along with Douglas fir, larch, spruce, cedar, and lodgepole pine—jumped an indicated 12.7 per cent over 1947, against a 7.2 average indicated increase of all species combined. Once an orphan wood given scant attention by producers and users alike, white fir is becoming recognized as a standard building material and its use will increase in the future. Production is estimated at close to 750,000,000 this year. Shipment ratio of the other species did not vary, although the shipment of Douglas fir of the Western Pine region continued its post-war trend of greater average proportion than before the conflict.

Developments of industry-sponsored waste utilization during 1948 took the form of inauguration of a study by the Western Pine Association's Research Laboratory of the problem. Individual companies, notably the larger organizations, have undertaken studies of their own. The studies are naturally tied in with the development of by-products.

Nearing the production stage is Staypak—compressed white fir—which has been in experiment status at the laboratory for several years. Harder than hardwood, Staypak may eventually be manufactured for paneling, flooring, and specialty uses.

Locomotive Tests in Southern California

AVAILABLE compressed air in large quantities and technical know-how in combustion problems are the reasons why some of the more important tests in the gas turbine locomotive development project of Bituminous Coal Research, Inc., are being carried on in southern California, at the Fontana steel mill and at the

Turbodyne Corporation at Hawthorne. This is part of the effort being made by the coal industry to develop a coal-using locomotive that would offset the oil-burning diesel.

Fontana was selected for full-scale testing of the coal handling apparatus about a year ago because it was the only place

in the country where compressed air was available in sufficient quantity. This was due to the fact that a blower had been installed there for an eventual second blast furnace, and this blower provided 100,000 cubic feet an hour, up to pressure of 40 lbs. p.s.i. absolute. The contribution of Turbodyne, an offshoot of Northrop Aircraft, was personnel skilled in internal combustion problems through work over the last five years on high capacity jet engines and gas turbines.

The Fontana tests have been going on for a year on a full-scale basis, and will continue until the problem has been solved of removing the ash from the output of the combustion chambers. Three main problems were encountered in the tests, as follows:

1. Pumping powdered coal into the combustion chamber under pressure. To meet this a pump has been developed cooperatively by Bituminous Coal Research and the Turbodyne Corporation.

2. How to burn coal in the type of compact all-metal combustion equipment necessary for a locomotive. WESTERN INDUSTRY is informed that the goal is in sight on this problem.

3. Getting the ash out of the products of combustion. This has been difficult because it is not merely a case of ash removal, but because the ash itself still contains combustible carbon even after the coal has been burned to 95 per cent of complete combustion. Removal and disposition of the ash is the hardest of the three main problems, and effort will be concentrated on solving it.

Of particular interest in the West is the fact that a gas turbine requires no water at all and will use low-grade fuel. Thus it is considered likely to be the answer to the emergency problem in such states as Colorado.

Economic Conference

Sources of capital, industrial development and public policies are three of the topics for the annual meeting of the Pacific Coast Economic Association to be held on the UCLA campus, Los Angeles, Jan. 30-31.

W. C. Dyer, superintendent of metallurgical chemical and inspection department, Geneva Steel Co., elected president of new Utah chapter, American Society for Metals. Don Rosenblatt, chief metallurgist, American Foundry & Machine Co., named vice-chairman, and Dr. H. Edward Flanders, professor of metallurgy, University of Utah, secretary-treasurer. Executive committeemen additionally include: Dr. John R. Lewis, professor and head of metallurgical engineering, University of Utah; Hugh M. Thomson, assistant chief engineer, Utah Oil Refining Co.; A. N. Hopper, plant manager, Salt Lake City Works, Chicago Bridge & Iron Co.; Robert J. Prout, supervisor, metallurgical laboratory, Geneva Steel; A. P. Hoelscher, assistant superintendent, industrial relations, Geneva Steel; and W. H. Mathesius, assistant superintendent open hearth department, Geneva Steel.

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Boiler Evap. in pounds per hr.	Approx. Cost of Deaerating Heater Installation	Approximate annual saving effected based on \$3.00 coal, 8 lbs. Evap. and 300 days operation if water temperature is increased						
		20°F.	40°F.	60°F.	80°F.	100°F.	120°F.	140°F.
15,000	\$1,600.00	\$ 345	\$ 710	\$1,050	\$1,400	\$ 1,740	\$ 2,100	\$ 2,430
30,000	2,100.00	690	1,420	2,100	2,800	3,480	4,200	4,860
45,000	2,650.00	1,035	2,130	3,150	4,200	5,220	6,300	7,290
60,000	3,200.00	1,380	2,840	4,200	5,600	6,960	8,400	9,720
75,000	3,700.00	1,725	3,550	5,250	7,000	8,700	10,500	12,150
100,000	4,600.00	2,300	4,720	7,000	9,320	11,600	14,000	16,200

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The accompanying table, developed by the engineering department of a large eastern manufacturing company, is of exceptional interest, convenience, and value.

Most tables of this type are objectionable to the average buyer because they do not mention "cost," and cost is usually of much interest to buyers. This table gives the approximate cost of six deaerating heater installations varying from 15,000 to 100,000 lb. of steam per hour. It then shows the savings that can be effected by each heater under seven different conditions of feed water temperature increase.

Thus, for example, if in a given plant 60,000 lb. of steam are evaporated per hour, the approximate cost of the deaerating heater installation will be \$3,200. The table shows that with a feed water temperature increase of only 60 deg. F. such a heater will save \$4,200 per year. Or putting it in another way, the heater will pay for itself and in addition will earn \$1,000 during its very first year of service. Thereafter, therefore, with the heater entirely paid, the profit will be \$4,200 per year.

Data on which the table is based are also given. In other words, it is based on sound engineering and does not exaggerate in any particular, which means that in many plants a heater will produce even greater profits than stated in the table.

Frank D. Mattos, manager, treating plants, Southern Pacific Co., Oakland, elected to honorary membership, American Wood-Preservers' Ass'n., Washington, D. C.

Marketing Development Annual Award Planned

Northern California Chapter of the American Marketing Association, San Francisco, announces plans to make an annual award to the individual in Northern California who makes the most outstanding contribution to marketing development each year.

The first award will be for work done in 1948 and nominations may be made until March 31, 1949, according to Robert E. Baxter, president of the San Francisco Chapter. Chapter members and judges will make the nominations but members and non-members alike will be considered for the recognition.

Members of the awards committee are J. M. Trickett, chairman; Roy S. Frothingham, Richard Hilliard, Carroll A. Snyder and Stuart P. Walsh.

Westinghouse Award

Charles P. Johnson, Western public relations manager for the Westinghouse Electric Corporation, has been awarded the Westinghouse Order of Merit for distinguished service, by Charles A. Dostal, vice-president in charge of sales, Pacific Coast district. The award was given for outstanding ability in interpreting Westinghouse to the public.

Prescott R. Lloyd named to the industrial sales division of California and Hawaiian Sugar Refining Corporation. He was formerly in charge of the food technology division of the Stanford Research Institute and previously with Libby, McNeill & Libby, National Canners Assn., and H. J. Heinz Corp.

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OPPORTUNITY SECTION

Wyoming Fears Loss Of \$25,000,000 Plant

Loss of a \$25,000,000 soda ash plant for Wyoming will result unless Congress gives businessmen the legal right to pay part of the freight cost in selling their goods, the Senate Trade Policies Committee in Washington, D.C., has been advised.

Robert D. Pike, consulting chemical engineer, Stamford, Conn., said such assurance will be necessary before the Wyoming plant for development of a vast deposit of trona can be constructed. The project is planned by the Westvaco (Wyo.) Chemical Company.

The witness said local buyers in Wyoming would get benefits of discounts.

Fish Industry Hope Lies in Tributaries

Dr. Paul Needham, Federal biologist recently appointed to handle the lower Columbia fishery plan offered in exchange for destruction of upriver spawning grounds by power dams, said there is little hope of transplanting to the lower river salmon runs which now spawn upriver.

Instead, he said, there is a good chance to build up salmon runs which already spawn in the lower basin tributaries so as to salvage part of the Columbia salmon fishery. The biological work involves a \$20,000,000 10-year expenditure for improving fish conditions below McNary Dam.

Low Cost Oils Used In New Gas Method

American Gas Association announces a new method has been developed for making manufactured gas of a heat content equivalent to natural gas entirely from low-cost heavy oils.

The new process through the use of cheaper grades of oil, it is reported, makes possible a reduction of 30 per cent or more in the cost of gas-making materials and an increase in thermal capacity of approximately 35 per cent in existing apparatus.

The process is the invention of Edwin L. Hall, director of the association's testing laboratories in Los Angeles and Cleveland.

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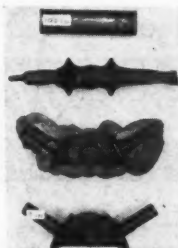
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INDEX TO ADVERTISERS IN THIS ISSUE

A		N	
Anaconda Copper Mining & Subs. Companies.....	3	National Supply Co., The	
Anaconda Wire & Cable Company.....	3	Machinery & Spang-Chalfant Div.....	11
B		O	
Boothe, Robert A.....	97	Oakite Products, Inc.....	90
C		P	
California Barrel Co., Ltd.....	3rd Cover	Pacific Coast Gas Assn.....	84
California Spring Co., Inc.....	79	Pacific Forging Die Company.....	97
Central States Mfg. Co., Inc.....	90	Pacific Gas & Electric Company.....	75
Clark Industrial Truck Division		Pacific Screw Products Corp.....	73
Clark Equipment Company.....	83	Pacific Telephone & Telegraph Co.....	89
Coldwell, Banker & Company.....	96	Pastushin, Vic, Industries, Inc.....	72
Colson Equipment & Supply Co.....	27	Permanente Metals Corporation,	
Cooper, J. T., Steel Company.....	91	Kaiser Aluminum Division.....	22
Crane Company.....	7		
Curtis Pneumatic Mach. Div.,		Q	
Curtis Mfg. Co.....	6	Quinton Engineers, Ltd.....	97
D		R	
Dow Corning Corporation.....	92	Republic Rubber Division,	
E		Lee Rubber & Tire Corporation.....	9
Eutectic Welding Alloys Corp.....	96	Revere Copper & Brass, Inc.....	63
F		Ridge Tool Company.....	95
Freuhauf Trailer Company of Calif.....	20	Rockett Pictures, Incorporated.....	87
G		Rubin, Jack, & Sons.....	97
General Chemical Division,		Russell, Burdsall & Ward Bolt & Nut Company.....	12
Allied Chemical & Dye Corp.....	13	Ryerson, Joseph T., & Son, Inc.....	28
General Paint Corp.....	87		
Goodall Rubber Company.....	88	S	
I		Shepard-Niles Crane & Hoist Co.....	25
Independent Iron Works.....	85	Signode Steel Strapping Co.....	24
J		Smoot-Holman Company.....	77
Johnston, A. P., Company.....	98	Stauffer Chemical Company.....	4
Jorgensen, Earl M., Co.....	71	Stephens-Adamson Mfg. Co.....	4th Cover
K		Stuart Oxygen Company.....	94
Kilsby, Perry, Inc.....	2nd Cover		
King, Irving G., & Company.....	97	T	
L		Tal Bender, Inc.....	90
La Haye Mfg. Co., Div.		Thomas Truck & Caster Co.....	91
Aluminum Products Company.....	97	Turner Chain & Belting Company.....	97
Lubriplate Division, Fiske Bros. Refining Co.....	89	U	
M		Uarco, Incorporated.....	18
Maltby, Edward D., Company.....	88	Union Pacific Railroad.....	26
Mathews Conveyer Co. West Coast.....	81	Union Starch & Refining Company, Inc.....	97
McDonald, B. F., Company.....	93	United States Steel Corporation.....	16
Metzgar Co.....	91	United States Steel Supply Company.....	16
		W	
		Wallace & Tiernan Co., Inc.....	88
		Western Asbestos Company.....	96
		White Motor Co.....	10
		Whiting Corporation.....	8
		Wirebound Box Mfgs. Association.....	14

Johnston Stainless Welding Rods

Anderson Equipment Co.
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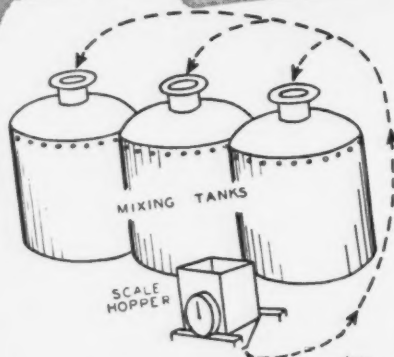
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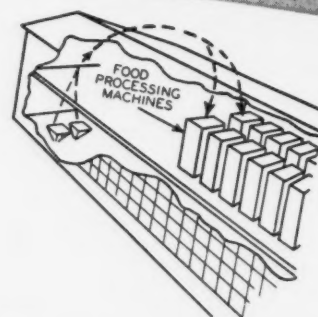


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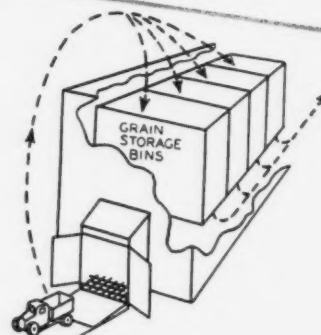
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